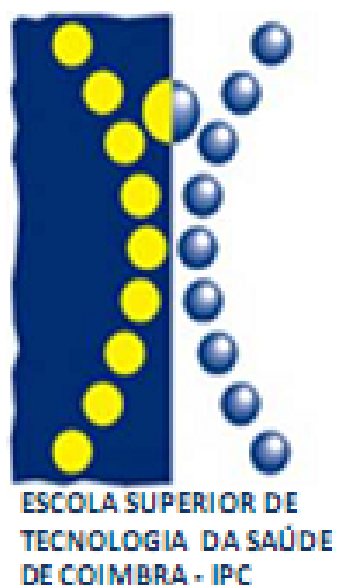


**ESTeSC – Coimbra Health School**

**Abstract Book**

**Poster Week 10/18**

**November 19th-23th, 2018**



## **SCIENTIFIC COMITEE**

Ana Catarina Almeida Pestana Lança  
Ana Catarina Vaz Pinheiro de Furtado Faria  
Ana Lúcia Baltazar Santos  
Anabela Conceição Carvalho Gonçalves  
António Jorge Dias Balteiro  
Célia Margarida Alcobia Gomes  
Cristina Sofia dos Reis Santos  
Cristiano Filipe Romão Matos  
Fernando José Figueiredo Agostinho d' Abreu Mendes  
João José de Moraes Joaquim  
João Pedro Marques Lima  
Joaquim Alberto Pereira  
Paulo Nuno Centeio Matafome  
Rui Santos Cruz  
Susana Mónica Marinho Paixão

## **EMAIL**

[posterweek@estescoimbra.pt](mailto:posterweek@estescoimbra.pt)

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PROGRAM

Poster Week 10/2018

Calendário

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10-11h	Cristiano Matos: 5P Curso: Farmácia UC: Introdução à Farmácia		Ana Lúcia Baltazar: 12P Curso: Farmácia UC: Nutrição		
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12-13h					
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14-15h		João Lima: 13P Curso: DN UC: Composição Nutricional dos Alimentos			
15-16h			Cristina Santos: 6P Curso: SA UC: Qualidade e Segurança Alimentar	Rui Cruz: 5P Curso: Farmácia UC: Organização, Gestão e Qualidade em Farmácia	Paulo Matafome: 9P Curso: Farmácia UC: Anatomofisiologia I
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17-18h					
18-19h	Ana C. Lança + Susana Paixão: 8P Curso: SA UC: Gestão do Habitat				
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Fernando Mendes: 7P; Curso: CBL;  
UC: Imunohemoterapia Clínica Laboratorial II

## **AREAS OF INTERVENTION OF PHARMACY TECHNICIANS - COMMUNITY PHARMACY**

***Ana Rita Ferreira, Irina Canossa, Ricardo Gonçalves, Sónia Francisco***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

### **Abstract**

In History, Community Pharmacies were initially called as “boticas” based on the preparation of medicinal products compounded from plants and natural products. Gradually the activities of the pharmacies began more focused on the citizens, emerging the development of community support services, thus going to the currently use of the designation of “Community Pharmacy”, representing nowadays one of the first healthcare services where patients goes when a health issue arises. Portugal is one of the countries in Europe that provides a wider range of services to the population in Community Pharmacies, being an area of extreme importance in the health system, in articulation with the primary healthcare network.

The main objective of this work is to study the importance of community pharmacies and the role of pharmacy technicians in their functions.

A bibliographical review was conducted, based on the Portuguese legislation, ordinances and articles. For the search documents since 2000 were considered.

Pharmacies are health units that are permanently engaged in innovation and skilled professionals to ensure and promote the quality and improvement of services provided to users. Pharmacy professionals, as pharmacists and pharmacy technician has the role of promotion and health protection , through the dispensation of prescribed medicines, counseling of over-the-counter medication, herbals and nutritional supplements and pharmacotherapeutic follow-up.

Patients identifies pharmacies as being a close available and trustful health service.

Nowadays the community pharmacies constitute a service with great importance in the life of the community, being empowered to do a personalized pharmacotherapeutic accompaniment and offer pharmaceutical care servicescentered in the patients.

**Keywords:** Key-words: Intervention Areas, Community Pharmacy, Community Support.

## EVOLUTIVE HISTORY OF PHARMACY TECHNICIANS IN PORTUGAL

**Ana Castro, Beatriz Marques, Gabriel Rodrigues, Joana Graça, João Marques, Rita Galinha**

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

With the evolution of technology, there has a need to train highly specialized professionals and vocationers for the different areas of the health sciences. This has been affirmed in Portugal and worldwide, assisting in the integration of these professionals in areas of diagnostic therapeutic, rehabilitation and health promotion interventions.

The aim of this review was to present the history and evolution of the pharmacy technicians in Portugal. The methodology focuses on scientific articles and other sources on this subject, for example master thesis, in Google Scholar.

There are two types of professionals with training in the field of drug use, pharmacists and pharmacy technicians, differentiating themselves by the training and functions they exert. This distinction occurred in 1980, post-Ultramar, when there was a need to rearrange and unify the level of training, and the course of pharmacy technician was created. The emergence of this profession dates from the year 1449, where the King D. Afonso V issued a permit that authorized the apothecaries (current pharmacists or pharmacy technicians) to practice the profession. The pharmacy technician does not only sell the medications in pharmacies, currently it has the capacity to work in research, teaching, distribution and sale of medications, being the increasingly special and personalized care for each disease.

In Portugal, pharmacy technicians have gained importance, knowledge, competencies and responsibilities that they did not have in a past not far away. In short, the pharmacy technician has obtained great value at national and international level and are formed to help each patient, integrating multidisciplinary teams in different areas of activity.

**Keywords:** Evolution, History, Pharmacy, Pharmacy Technicians

## **JOB OPPORTUNITIES FOR PHARMACY TECHNICIANS**

***Ana Margarida Fernandes, Andreia Santos, Carla Coelho, Carolina Araújo***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Pharmacy Technician is a professional whose importance, knowledge and skills have been increasing in recent years. Accordingly Portuguese legislation, pharmacy technicians are healthcare professionals that participate in the entire drug circuit, from development to patient dispensing, ensuring its quality and management and providing advice to patients and health professionals about the use of the medicine and health products. Their activities have been crucial due to the attention, time and dedication that has been provided to the patients

For this research, PubMed database and “European Association of Pharmacy Technicians” website were used for search. From the last 5 years, 2 articles and 3 institutional websites were selected for analysis.

Pharmacy Technicians intervene in therapy, prevention of disease and health promotion. In Community pharmacies they have a central role on dispensing of prescriptions and counselling of over-the-counter medicines, herbals and other health products. On the other hand, on hospital pharmacy they intervene in drug dispensing for hospital, unit-drug dispensing for inpatients or compounding (as nutrition or oncology). Other jobs opportunities include radiopharmaceuticals, medical sales, research, teaching and management.

In Portugal, greatest job opportunities are on community pharmacy and hospital pharmacy, however, other opportunities has been increasing, as radiopharmaceuticals compounding, pharmaceutical industry and research, but the number of professionals remains low. After graduation, it is crucial to new pharmacy technicians to understand the different job opportunities. Intervention areas are expanding and pharmacy technicians have the possibility to intervene wherever drugs are present.

**Keywords:** Pharmacy Technician; Job opportunities; Career.

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## THE HEALTH POLICY IN PORTUGAL - NATIONAL HEALTH SYSTEM

***Ana Daniela, Camila Bastos, Filipe Estevão, Francisco Teixeira, Joana Coelho***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

**Objective:** This review analyzes the health policy in Portugal and the National Health System (SNS), with the purpose of understanding their structure and the evolution.

**Methods:** During the October 2018 different sources of bibliographic were used as websites, books and scientific articles, in which several documents were found but just were selected about ten for further study.

**Discussion:** It was possible to verify that health is a factor of integration and social cohesion, and several changes in health policies occurred from the 1980s throughout Europe, particularly in Portugal, with the objective of decrease associated costs and to guarantee the sustainability of health systems. These measures generated gains that have put Portugal at the same level of other European countries, extending the live quality and expectancy of Portuguese population, consequently reducing many of the inequalities that have been going on for centuries. So, with the purpose of achieve more health quality for everyone, the Portuguese' SNS has distributed its intervention in two methods, in which one focus on the interventions on the family and the life cycle and the other one approach the health problems through an approximation in the management of the disease.

**Keywords:** Health, quality and Portugal

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## **REGULATION OF DIAGNOSTIC AND THERAPEUTIC TECHNICIANS - HISTORY AND FUTURE PERSPECTIVES**

***Ana Rita Amaro, Rafael Tavares, Roberta Pereira, Teresa Margarida Alves***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Superior Diagnostic and Therapy' Technicians (TSDT) are healthcare professionals that perform technical activities of diagnosis of diseases (such as analyses, examinations), intervene in the treatment of diseases (in pharmacies, radiotherapy) or in the rehabilitation of patients (as physiotherapy, speech therapy). These professionals intervene both in public and private sectors, as hospitals, clinics or pharmacies. The objective of this review was to understand the state of art regarding regulation of TSDT in Portugal. Review was based on the current legislation for these professions, including the Decree Law 110/2017 and 111/2017 of August 31st) which establish the special career regimen in the areas of diagnosis and therapeutics, namely for public health sector.

The TSDT regulation it's implied in the health careers special revision process since it constitutes a need in the public administration framework reform. Its regulation aims at adapting the rights and duties of TSDT to the current reality, taking into account its academic, scientific and technological evolution.

For the public sector, a new career is currently under negotiation. When it comes to the future perspectives in this field, the intention of having a special carrer arises from the technical complexity that these professions have achieved over the last years, with a high level of competencies and skills focused on patient care and increasingly sophisticated practices to deal with the diseases.

The special career of TSDT, reserved to registered professionals in the professional body (Administração Central do Sistema de Saúde), is divided into three broad categories and applies to all TSDT with a contract for public functions.. The expectation of professionals is that this new legal framework brings professional recognition, salary updates and professional progression adequate to the level of complexity of these professions.

**Keywords:** TSDT, Carrers, Regulation, Health

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## HISTORY OF PHARMACY AND MEDICINES

***Aya Kassah, Diana Pereira, Kanan Rasha, Telma Medroa***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Introduction: The pharmacy, emerges in the archaic societies because, at that time, the man nourished the need to relieve his pains and did so by mixing substances until obtaining the cure. Treatments were compounded mostly from plants. Two of the most important civilizations in the history of pharmacy were Egypt and Mesopotamia, which provided the earliest pharmaceutical medical written sources like the Ebers Papyrus. Only in Greece and Rome, 16th century, is a scientific explanation about the pharmaceutical and medical area. Two of the main names that contributed to this explanation are Hippocrates, considered the father of medicine and Galen the father of the pharmacy he developed several "galenic" remedies, used and classified herbs and elaborated "teriaga", a mixture of wine and herbs, used as antidote.

The objective of this review was to collect the most important events in the history of pharmacy.

Methodology: Based on a bibliographic review performed in October 2018, eight articles from Google Scholar and a Google website were selected. After a brief analysis, five articles were selected to be used.

Results/ discussion: There are a lot of differences between the beginning of the history of the pharmacy and drugs and today.

In the 13th century, the first apothecaries appeared, who had the responsibility to know and heal the diseases and with them the first drug stores that were establishments fixed for the sale of medicinal products. The apothecary manipulated and produced the medications according to the medical prescription. Only in the twentieth century, pharmacies emerged. Man was increasingly more conscious of diseases and, tried to protect himself by using things provided from nature. Today, modern pharmacology is based on the relationship between the chemical structure of natural or synthetic compounds and their possible pharmacological action, increasing the results, but still keeps somewhat in the same line as primitive medicine and pharmacy.

**Keywords:** history, pharmacy apothecary, pharmacology

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## PROFESSIONAL QUALIFICATIONS AND SKILLS OF A PHARMACY TECHNICIAN

***Cátia Oliveira, Érica Peres, Francisco Salgado, João Tavares, Tatiana Costa***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

**Background:** In Portugal, there are two different types of professionals with training in the drug area, including pharmacists, with a Master degree in Pharmaceutical Sciences, and pharmacy technicians, with a Bachelor in Pharmacy. Both professionals intervene throughout the drug circuit, with full professional responsibility and technical autonomy, and work in multidisciplinary teams throughout the entire drug circuit.

**Objective:** In this review were analysed the profile and competencies of the pharmacy technicians.

**Methods:** Data were obtained through the Portuguese legislation and master dissertation during October 2018, having been reviewed four documents of which three were selected for this study.

**Results/Discussion:** Pharmacy technicians are able to accomplish tasks on the realization of pharmacologic analyses and tests; the interpretation of therapeutic prescriptions and pharmaceutical formulas, their preparation, identification and distribution, including the distribution of medicines stocks and other medical products; conservation control and providing information and advice patients on the use of the drugs, keeping the quality and safety standards of drugs. These functions are fundamentally of practical nature, being characterized by the management of specific techniques of the pharmacy area.

**Conclusion:** It was possible to observe that the pharmacy technician are professionals whose importance, competencies and responsibilities have been increasing in recent years, highlighting the adaptive capacity of the various scenarios of action, being a profession that develops in functional complementarity with other professional health groups, with equal dignity and technical autonomy of professional practice.

**Keywords:** Pharmacy technician; Profile; Profession skills; Drug.

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## PHARMACY TECHNICIANS PROFESSION IN EUROPE

***Carolina Silva, Mafalda Machado, Timóteo Ladeira, Moushir Affaki, Rawan Nasser***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Introduction: Within the EU there's a data base of regulated professions, which the access is made through minimum requirements. You must have qualifications to exercise. For the scope of EAPT (European Association of Pharmacy Technicians), a pharmacy technician is the professional support that works with pharmacists. We'll address some studies conducted by EAPT where are presented EU members that are part of this.

Methodology: Our information was parsed from the EU page and EAPT website during October 2018. Studies conducted by EAPT were addressed and those results, presented by their members, were selected in a 2017 document, titled "Community Pharmacy Technicians".

Results: Within the EU, several countries have different considerations, within the same subject being valued different aspects for better education and vocational training. Pharmacy technicians are a regulated profession in 22 countries, however it exists in other countries, but as a non-regulated profession. The European Professional Card is a procedure that allows the recognition of a regulated profession in another country within the EU. The linguistic area is quite essential, especially when communication is necessary for the success of the profession. In the provision of services abroad temporarily, you must submit a written statement. It's required several information (name, nationality, profession, etc.).

Conclusion: The Pharmacy technician is a professional whose importance, knowledge, competences and responsibilities have grown, so it's increasingly important to understand your role in the National and European level terrain. In this work it was possible to present the reality of this profession and clear up any doubts you have about this profession.

**Keywords:** Pharmacy, Profession, European Union

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## **AREAS OF INTERVENTION OF PHARMACY TECHNICIANS - HOSPITAL PHARMACY**

***Carlota Pina, Iara Coelho, Inês Silva, Margarida Martins, Ricardo Madeira***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Hospital Pharmacy (HP) integrates a service in hospitals where mostly of drug circuit occurs. Pharmacy Technicians have an important role in HP once they accomplish various tasks such as pharmacological analyses and tests, interpretation of therapeutic prescription and pharmaceutical formulas, their preparation, identification and distribution, control of the conservation, stocks of medicines and other products, information and advice on the use the medication. The objective of this review was to describe the role of pharmacy technicians in hospital pharmacy. For this purpose, a bibliographic review was performed about hospital pharmacy during October 2018. The hospital pharmacy good practices have the objective of giving quality of assistance by using medications in a safe and rational way, adapting those medications to the needs of the patients. In hospital pharmacies intervene two types of healthcare professionals, with special focus on medicines use. Technical coordination is assumed by pharmacists. Pharmacy Technicians intervene at the Hospital Pharmacy level since the reception of medicines and other health products, their storage; preparation of non-sterile medicines, parenteral nutrition and cytotoxic drugs and in the distribution of medicines for inpatient and outpatients. The discussion, selection and purchase of medicines, as well as clinical trials, clinical pharmacokinetics and seric monitoring are usually performed by pharmacists, however all activities listed are not forbidden for both professionals.

**Keywords:** Hospital pharmacy, medications

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## THE PORTUGUESE NATIONAL HEALTH SERVICE

***Catarina Seixas, Elsa Silvestre, Gabriela Teixeira, Maria Maia, Melanie Cantante***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Introduction: The National Health System (SNS) and your evolution are of great complexity, as in all other countries. Health policy is a program developed by the Government in order to give opportunity to the entire population to use of health services in the same way. The Portuguese' SNS is marked by social and individual responsibility in the financing of health care in order to ensure and provide care to the population..

Methodology: S even articles and three government sites were used for this review. Review was conducted during October 2018.

Results: Technological scientific, economic and social development, overcome many of the health problems of elderly, however today more complex problems arise, such as the change in healthcare caused by increase in average life expectancy, the increasingly common aging of society or the higher incidence and prevalence of chronic diseases. This set of problems will give the SNS challenges to the future..

Regarding technological advances, the SNS 24 is a telephone line, which contains the management of information services, screening, monitoring, routing and telecare. These services can be accessed through the Internet, telephone, smartphone app and tv.

Conclusion: The Portuguese' SNS can provide good healthcare to their users, but the lack of funding makes this process not accessible to all.

**Keywords:** Health, money, care

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## ALLOPATHY VS. HOMEOPATHY

***Carolina Matias, Deise Santos, Sara Umbelino***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Allopathy is a therapeutic system which aims to treat the pathologies by counteracting them, through medications with specific action on the symptoms. The disease originates from the effects of an infectious agent, in a biochemical or cellular alteration and in several changes in the organism being therefore the treatment based on eliminating or neutralizing the cause. In this perspective, drugs are mass-produced by the pharmaceutical industry in predetermined doses. However, allopathic drugs can promote various side effects and have certain levels of toxicity when poorly administered.

On the other hand, homeopathy does the opposite of allopathy, in which the disease is defined by an imbalance of the organism as a whole causing several symptoms. These are fought with drugs that cause the same symptoms, in consequence the organism develops the response becoming stronger. These drugs aren't as aggressive because they act on the healing and restorative capability of the organism, making it have more strength to face what is harming it, preventing several diseases.

However, homeopathic drugs are targets of skepticism by some scientists since the action mechanism hasn't yet been properly defined and it's notorious the difficulty in applying the conventional statistical methodology of clinical trials. Another controversy in homeopathy concerns the small doses of medication: while in allopathic drugs the concentration of active principle is high, in homeopathic the active principle is highly diluted in other substances.

In addition to that, these two processes also show differences in the effects they cause. Allopathic drugs integrate synthetic materials into their composition, which usually have negative effects on the patient. In homeopathic drugs, because they have a lower concentration of active ingredients that are 100 percent natural, these effects are not seen so often.

**Keywords:** Allopathy, Homeopathy, Active Principle

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## MAGISTRAL AND OFFICIAL PREPARATIONS

***Adriana Dourado, Margarida Dias, Maria João Ferreira***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Most of medicines available are industrial drugs, produced in pharmaceutical industries. However, there are manipulated medicines that are produced according to magistral or officinal formulas, whose preparation is responsibility of pharmacies or hospital pharmaceutical services.

A magistral preparation is a medicine done at a pharmacy in a workshop or hospital, according to a prescription and intended for a specific patient.

An officinal preparation is made according to compendial indications of a pharmacopoeia in a pharmacy of workshop or hospital and, unlike a magistral preparation, is destined to be dispensed directly to the patients assisted by the pharmacy.

Manipulated drugs have several advantages, they are usually cheaper, administrations are easier, dosages can be adjusted according to each patient, thus avoiding unnecessary expenditure and reducing waste. The biggest disadvantage of this type of medication is the difficulty in inspection by the sanitary organs.

When prescribing a magistral formula, the doctor should make sure of its safety, checking for the possibility of interactions that affect the efficacy of the drug and making sure that the patient is not at risk.

When dispensed, the pharmacy professional shall ensure that all relevant information is provided to the patient, regarding the dosage / mode of use, storage conditions and shelf-life.

**Keywords:** Industrial Drug, Magistral Preparation, Manipulated Medication, Officinal Preparation

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## **GASTRO-RESISTANT CAPSULES**

***Carolina Valeiro, Mariana Amador, Teresa Pinheiro***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Capsules are a solid pharmaceutical dosage form most of the times taken orally, in which a drug or a mixture of drugs is enclosed in a gelatine shell that, in contact with the gastric fluid, releases its content.

On the other hand, enteric capsules present a polymer barrier, which modifies when and where the drugs are released, so it can only disintegrate if it's in the intestine, thanks to the basic pH. They secure pharmacologic and pharmacokinetic efficacy of instable substances in an acid environment, protecting the gastric mucosa from irritating drugs, preventing an emetic effect and the degradation of drugs fragile to acid pHs. Therewith, the absorption is delayed, allowing the content to only be released in the intestine, improving the therapeutic response without being affected by the gastric acid.

In the event of the enclosure is destructed, the drug can become inactive, with no active response. When it comes to the materials used for enteric coatings, there are formaldehyde, cellulose-based compound (cellulose acetofthalate + triacetin + methanol + chloroform) and shellac in an alcoholic solution.

A study was carried out in order to develop an innovative formulation of gastro-resistant tablets of Omeprazol 20mg. The gastro-resistant coating was evaluated through an acid resistance test and the capsules remained intact and with any deformation. The results showed that, with this type of coating, tablets have a better delayed release system.

**Keywords:** Gastro-resistance, Coating, Capsules

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## REVULSIVES

***Carolina Castanheira, Mariana Cardoso, Rita Gonçalves***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Revulsives, or counterirritants, are drugs that are designed to create a congestion in the adjacent tissues through a local irritant action. The preferential route of administration in these medicaments is the topical route, being administered in the galenic form of ointments and patches in the epidermal regions of the skin.

These are classified as rubefacient and vesicant. The rubefacients causes hyperemia at the application local like mustard, turpentine, pepper, camphor, methyl salicylate, menthol and ammonia.

Mustard is used in the form of cataplasm or sinapism, and its active ingredient is dissolved in alcohol, constituting the allyl isosulfocyanate alcohol solution. Ammonia is the most widely used counterirritant, either in aqueous solution, or in the form of ointment. Methyl salicylate is used in cataplasms, containing kaolin as excipient.

The vesicants, beyond hyperemia, produce an epidermal blister, with oozing fluids. These are utilized to control more intense forms of pain and inflammation. Examples of the vesicants are cantharides, acetic acid, mustard and iodine. The cantharides act by its active ingredient (cantharidin), being a highly blistering drug. It can be applied as a tincture, sinapism, ointment and plaster.

Nowadays, these drugs are not used as often, especially the vesicants given the risk associated with their application. Mustard was a drug that become outdated, unlike methyl salicylate which is the latest and most useful.

**Keywords:** Revulsives; Rubefacients and Vesicants; Topical Route

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## EMOLLIENTS

**Ana Rita Silva, Inês Bravo, Joana Carvalho**

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Human's skin hydration can occur by external means which is characterized by the use of pharmaceutical products and cosmetics on the most exterior layers of the skin.

Emollients are lipids and oily compounds that act by hydrate, soften, lubricate, reducing the irritations and the treat the driest skin. This way allow to improve the skin's appearance and contributing to its softness and flexibility. They are, usually, used in pharmaceutical products of topic use and cosmetics formulations. Despite all advantages, they are products comedogenic so they can block skin pores.

These act through occlusion mechanisms and hydration as they lead the formation of a film that prevent the loss of transdermic water entail to be diffuse by the layers of the own skin. This way contribute to the stratum cornea and cutaneous` barrier.

The emollients can be classified by its physico-chemical properties and application on the skin's properties. But, the best classification to understanding of which substances have an emollient effect is according to the chemical structure.

The emollients indication is conceded for the dairy care of dry skin, in desquamate stages and in atopic patients and its efficiency rises when used immediately after the bath or on still wet skin.

There is a big variety of emollients that should be chosen according to the final product aim's characteristics: The market; the costumer (people with dry skin, oily skin, etc.), the easiness of incorporation, the compatibility to other components (especially sun blockers) and the price.

**Keywords:** Emollients, Skin, Hydration

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## MICROEMULSIONS

***Carla Pinto, Mariana Leal, Sara Coelho***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

The microemulsions are defined as systems thermodynamically stable, transparent, optically isotropic, and low viscosity. They are constituted by two immiscible liquids stabilized by a film of surfactant compounds located at the oil/water interface. Thus, unlike other emulsion systems where the oil droplets can coalesce slowly causing phase separation, in microemulsions this doesn't happen. These can take different forms: water in oil microemulsions that form when the water volume is low and contain droplets of water surrounded by a continuous phase of oil. Bicontinuous microemulsions which are systems where the quantities of water and oil are similar and Oil-in-water microemulsions that form when the oil volume is low and contain oil droplets surrounded by a continuous aqueous phase.

Currently, the study of new drug delivery systems has been very relevant in the pharmaceutical area, because it provides modern therapeutic alternatives, pharmacologically more efficient and with reduced side effects.

The microemulsions are suitable for these purposes and have been used in a way to increase bioavailability and decrease the toxicity of various drugs.

These can protect drugs from decomposition or accelerate these processes as well as they are able to direct them to specific tissues or cells of the organism. The microemulsions have also been used in the strategy to increase the therapeutic index of antineoplastic chemotherapeutics with the consequent reduction of the severe toxic effects of these drugs.

In short, the properties of the microemulsions are extremely varied, being that the great diversity of its application is a direct consequence of this aspect.

**Keywords:** Microemulsions; New drug delivery systems; Modern therapeutic alternatives

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## MICROENCAPSULATION

**Ana Cerveira, Bárbara Cardoso, Eduarda Coelho**

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Microencapsulation is a process where it is used a coating material, acting as a protecting film, leading to the formation of continuous or porous membranes.

The purpose of microencapsulation is: isolate a certain substance of interest, protecting it from adverse conditions, with this, increasing the product life expectancy; minimize drug incompatibilities; release the drug in a specific time, which is important for its bioavailability; long lasting actions, since the drug is slowly released.

Microencapsulation includes physical methods, like spray drying, spray cooling, thermal reservoir pulverization, co-crystallization, and chemical methods, such as molecular inclusion. There are still physical-chemical methods that include phase separation, one of the most used processes, characterized by physical-chemical changes.

The choice of the coating material changes according to the encapsulated product, the type of particles, the final purpose, and even the physical-chemical properties and the process used to manufacture the macroparticles.

This process is now more and more used, besides avoiding sample degradation, it also prevents the pharmacotechnic inconvenience of insolubility that comes from aqueous solutions, since that most part of the substances have low solubility in water.

So, even though it is a technique with great potentialities in various areas, like pharmaceutical, alimentary, cosmetic, it still requires a lot of studies about interactions, and physical-chemical features of coating materials.

**Keywords:** Microencapsulation, Macroparticles, Slowly released

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## PROTECTORS

***Cristiana Sobral, Lúcia Pereira, Mariana Lima***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Protectors are medicines which its principal function is defending the tissues where they are applied, making an intern and external action. Inside this category, stands out the sunscreens and gastric protectors.

The sunscreens are topic preparations used as external protection. Its active compounds lower the amount of radiation that penetrates the skin. They do not assure a complete protection because none of them filters the UV radiation totally.

The UV radiation promotes the skin pigmentation and supports the melanin production.

Protectors must be: non-toxic, non-sensitizing, non-volatile and non-mutagenic, can't cause irritation, compatible with the formulation and storage material, stable in its final product and must present soluble appropriated characteristics.

The main photoprotector galenic forms are creams, gels, oils, sprays, lotions, emulsions, and suspensions.

The gastric protectors are drugs that promote an internal protection. They inhibit the proton pump (IPP) and lower the production of stomach acid, reducing the dyspepsia. The main stimulators in the stomach acid production are the histamine, acetylcholine and the gastrin. The IPP are drugs that irreversibly inhibits the ATPaseH<sup>+</sup>/K<sup>+</sup>, being considered prodrugs.

The gastric proton pump it's an ATPase present in the inactive parietal cell cytoplasmatic membrane. When activated the pump expels the H<sup>+</sup> into the gastric lumen switching it with the K<sup>+</sup>.

As alternative therapeutics, we can resort to antacids or to the antagonists of the H<sub>2</sub> receptors.

In conclusion, the gastric protectors and the sunscreens hold a fundamental action in the protection of the tissues, assuring the healthy state of the people.

**Keywords:** Protection, Radiation, Gastric proton pump, Galenic forms

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## KERATOLYTICS

***Adriana Matos, Dina Marques, Jéssica Melo***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Keratolytics are substances that dissolve or destroy the skin's most superficial layer, the epidermis, thereby reducing its thickness and stimulating regeneration through exfoliation, which removes dead cells for better absorption of the active ingredient. The keratolytic action forces the keratin to expand its volume causing tissue softening and consequently desquamation.

The active principles act on the keratinocytes dissolving the keratinic formations, being used in the treatment for the elimination of warts, scars, acne, calluses and callosities and other skin lesions.

Most keratosis are treated with keratolytic acids and actives such as urea, benzoyl peroxide, malic acid, retinoic acid, and salicylic acid, and to prevent relapses, moisturizers with lower concentrations than these active ingredients are used, but in more severe cases local microsurgery is necessary to remove keratosis that is then sent for biopsy.

Keratolytic products can be used in various concentrations according to their purpose: <5% as moisturizers and emollients, <12% are renewers of the epidermal layer and >20% are keratolytics that function as chemical peels.

Most keratolytic products can be used as treatment or as maintenance to prevent relapses. They can act as exfoliants by removing the dead cells so that a better absorption of the product occurs stimulating the skin regeneration or as moisturizers, softening the epidermis making the skin more malleable, thus avoiding its thickening.

**Keywords:** Keratolytic, Keratin, Keratosis, Emollients, Acid Salicylic

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## KERATOPLASTICS

***Duarte Gomes, Miguel Silva, Pedro Martins***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Keratoplastics are medicines that intensify the keratinization of the epithelium, promoting the regeneration of the horny layer which corresponds to the skin's most external cellular zone.

These perform its function through an epithelium's keratinization process (cellular surface's cells became firm due to keratin's entrance in the same).

This kind of medicines are presented in the galenic form of the polishes and creams, being there necessary caution to the skin layer's thickness since this galenic form will act directly with the drug's penetration and with their respective mode of acting.

We have two types of keratoplastics:

Cellular Keratoplastics act by stimulation of the activity of Malpighi mucosal body's cell, being that stimulation gives origin to epithelium's renovation until skin's surface, promoting the keratinization. The most used medicines are Picric Acid and Trintrophenol.

Reducers Keratoplastics act by epithelium's superficial cell's suffocation, taking off the oxygen from the cells through the reducer's molecules, which stimulates a keratinization. The most used medicines are Ichthyol and Tar.

This Types of Medicines are presented in the galenic form of polishes and creams that differ by the viscosity and composition. Polishes are thicker that creams, creating a skin's barrier, allowing a better absorption of active principles presents on. We have a necessary caution to the skin layer's thickness since the galenic form will act directly this galenic form will act directly with the drug's penetration and with their respective mode of acting.

**Keywords:** Keratoplastics, Keratinization, Polishes, Epithelium's Regeneration, Skin

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## MULTIPLE EMULSIONS

***Miguel Maia, Pedro Ribeiro, Hericson Monteiro***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

The multiple emulsions or double emulsions are microcompartmentalized systems, apparently of single-phase. They are formed by 3 phases. They can be of two types, most common, water, oil, water (W/ O / W) and oil, water, oil (O / W / O). The components of an emulsion are: aqueous phase, oil phase and emulsifying agents. Characteristics of emulsifying agents: they cannot interfere with the stability and efficacy of the active principle, they must be chemically stable, innocuous, odorless, tasteless, colorless and effective in low concentrations. Types of emulsifier's agents: hydrophilic colloids, surfactants, finely divided solids.

Double emulsions have a high potential in the transport and controlled release of encapsulated bioactive components and protection of these substances from the oxidation and the action of certain enzymes after their ingestion and during the digestive process. They have low thermodynamic stability, therefore, during the storage time, changes in their structure can occur, which cause the loss of bioactive components encapsulated in them.

The multiple emulsions are made using two emulsifiers, one hydrophilic, and one lipophilic. These emulsifiers contribute to the obtaining of well-defined composition systems with a more homogeneous particle size distribution.

The multiple emulsions, which can be administered orally, parenterally (intravenously, subcutaneously, intramuscularly) and topically. They have several advantages: controlled release capacity of active compounds, ability to protect the encapsulated species from degradation, high biocompatibility, biodegradable, and drug targeting possibility. As disadvantages: low physical or physic-chemical stability, easily degraded in physical processes.

**Keywords:** Multiple emulsions, Emulsifiers, Emulsifying agents, Emulsifiable agents, Thermodynamic stability

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## **ASTRINGENTS**

***Joana Rodrigues, Levi Alves***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Astringents are topical medications that cause constriction of the skin, blood vessels, tissues and mucosal surfaces, leading to a decrease in secretions and discharge.

The mode of action of these drugs is based on the local vasoconstriction and coagulation of the albumins - the main plasma proteins - and the consequent origin of a film that acts in the absorption of exudates of wounds and rashes.

We can classify the astringents into three categories according to their mode of action: astringents that decrease blood supply, astringents that absorb water from the tissue and astringents that have the ability to coagulate tissue and form a crust.

Thus, these medicines can be used: in the medical field - to staunch small bleeding, in capillaries or other small blood vessels, thus denominated as styptic; in the area of cosmetics, such as deodorants, antiperspirants, soaps and creams, due to the constriction effect of the pores, which reduces secretions.

Astringents are applied in aqueous solutions, ointments, suppositories, ova and patches. Being the main active principles copper sulfate, aluminum chloride, aluminum acetotartrate, silver nitrate, yellow mercury oxide, zinc oxide and lead.

In addition to the metal composition astringents mentioned before, there are also the tannins that have the same constitutive action on the irritated or hypersecreting outer mucosae, due to their coagulating effect of superficial tissue albumins. These are used in aqueous solutions for application to the buccal or vaginal mucosae.

Astringent substances can also be found in fruits, plants, teas and red wines.

**Keywords:** Astringents, Vasoconstriction, Styptics, Tannins

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## CLINICAL PHARMACOKINETICS

***Andreia Louro, Beatriz Rodrigues, Natacha Roseiro, Ruben Costa***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

The hospital pharmacy is characterized by a set of health care applied in a hospital context, being an area in constant evolution whose main objective is to guarantee the quality and safety of medication.

Hospital pharmaceutical services are divided into several areas, including the management area, distribution area, laboratory and handling areas. In the last-mentioned ones is inserted the sector of Clinical Pharmacokinetics, which began to develop in an American hospital environment, in the 60's, due to the growth of Biopharmacy and Pharmacokinetics in universities.

The aim of this work is to define the service of Clinical Pharmacokinetics in the hospital pharmacy.

This service has a multidisciplinary character whose purpose is to personalize the medical care in order to achieve the best therapeutic results possible, minimizing adverse events that result from the ingestion of drugs. In order to achieve better pharmacological therapeutic responses, it is necessary to know the serum levels of the drug.

A Clinical Pharmacokinetics service always requires a laboratory to measure the concentration of the drugs. This must be attended by a specialized pharmacy professional with solid knowledge about pharmacokinetics, pharmacotherapy and patient-related monitoring.

In conclusion, it should be noted that therapeutic success affects the quality of the patient life and the duration of the treatment, as well as the evolution of medical practice, since it changes the medication prescription habits. Better understanding of the action of the drugs and the transmission of this information to the patient results in a better adherence to the therapy.

**Keywords:** hospital, pharmacy, pharmacokinetic, pharmacotherapy, therapeutic success

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## COMPOUNDING DRUGS IN HOSPITAL PHARMACY

***Beatriz Loureiro, Diana Guerra, Inês Ferreira, Iva Soares***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Nowadays, there is a greater demand for manipulated drugs, with the aim of finding therapeutic alternatives not yet available by the pharmaceutical industry, targeting, for instance, geriatrics, pediatrics and oncology.

A manipulated medicinal product is any magistral or officinal formula, prepared and dispensed under the responsibility of a pharmacy professional, specific to a certain patient. They include medicines for nutritional support and oncological treatment, of which cytotoxic drugs stand out. These are defined by their genotoxicity, mutagenicity, carcinogenicity, teratogenicity, reproductive and organic toxicity in low doses.

The current standards of quality are integrated in the Good Manufacturing Practices (GMP), which aim at quality, safety and efficiency of these drugs, following standards and requirements approved by INFARMED, such as ISO 9001: 2008 regulation, that is one of the most known and universally used for the certification of quality management systems in any area.

Thus, we present a study that aimed to evaluate the existence of a System of Evaluation of Medications in Hospital Pharmacy, which introduction proved too had been valuable for the construction of the Quality Manual. The implementation of the previous regulation is related to the quality of the final product as well as the decrease of the probability of error associated with the active substance, the solvent and the dose to be administered.

Quality and innovation are the determining factors of competitiveness, indispensable to the sustainable growth of the economy.

**Keywords:** Manipulated drugs, Cytotoxic, Good Manufacturing Practices

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## **EHEALTH AND THERAPEUTIC ADHERENCE**

***Beatriz Almeida, Beatriz Pedro, Lúcia Pereira, Mariana Rodrigues***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Currently, a major concern in health is non-adherence to therapy, which according to WHO refers to “the extent of a person's behavior - taking medication, following a diet and/or performing lifestyle changes - corresponds to the agreed recommendations of a health care provider ”. This may be intentional or unintentional.

There is an international interest in exploiting the potential of digital solutions to improve the quality and safety of healthcare. eHealth is the use of a wide range of information and communication technologies for health, defending that more intelligent personalization and monitoring could lead to increased adherence. Therefore, our main goal is to address the use of eHealth strategies to promote adherence to therapy.

In the scope of adherence, technology acts as a source of information and improves adherence itself, since the messages warn the patients to take medications, monitor parameters or inform the next consultations. However, older people and individuals with lower levels of education are less receptive to text messages or applications, so eHealth needs to investigate alternatives.

eHealth can affect drug management at all levels: macro (health system level), meso (clinics, pharmacies) and micro (individual patients and carers).

Although, there is still a major gap in research on the risks of implementing these technologies and their cost-effectiveness relation.

In the future, we expect that eHealth will be able to support and strengthen cross-checking, pointing out the importance of digital literacy, patient safety that can't be compromised, and privacy of health data.

**Keywords:** eHealth; adherence; technologies

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## **ECONOMIC MANAGEMENT OF DRUGS STOCKS**

***Diana Ferreira, Joana Rodrigues, Maria Marmé, Marta Prata***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

The stock corresponds to the number of assets or materials stored, whose purpose may be the sale or use by the institution itself. In the hospital, it is possible to group the materials into 5 large divisions. In order to predict the consumptions that will be needed in each organization, it is important to follow two techniques of stocks: the qualitative and the quantitative technique.

This work aims to characterize techniques of drug stock management in a hospital context.

So, becomes important to realize stock management. This can be defined as a reduction of costs by the use of models suited the health service, without losing its quality. These models correspond to the Continuous Review Model and the Periodic Review Model, which differ in the quantity and frequency of the order. In the first model, the number of products ordered is constant and the periodicity varies, while in the second model the amount of ordered articles is variable and the periodicity is constant.

In this management we can enunciate two big systems of classification of articles that allow the control of the stocks. The ABC classification that identifies the medicines by their degree of financial relevance, the XYZ classification where the products are classified based on their degree of indispensability and the ABC-XYZ classification that integrates these two concepts.

Concluding, this service is to ensure that the provision of health care is safe and economical, in order to don't put the patient at risk and the hospital doesn't spending unnecessary money.

**Keywords:** drugs stock, economic management, hospital pharmacy

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#### IV ADMIXTURE/ TERAPEUTICS PARENTERAL NUTRITION SERVICE

***Adriana Gomes, Ana Guedes, Rui Soares, Tatiana Vieira***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Parenteral nutrition is a generally accepted form of treatment when the gastrointestinal system is ineffective /inaccessible. It's a way of providing intravenously the nutrients necessary for the maintenance of life and must involve the administration of a carefully balanced nutritional mixture providing a better state of health, maintenance or improvement in the quality of life. Therefore, our goal is to make a current characterization of the parenteral nutrition service.

It's important for nutritional practice, their professionals and respective associations to reach consensus on the terminology and criteria to be used for nutritional disorders as well as essential nutritional procedures such as screening, assessment, treatment and monitoring. However, there may be errors in prescription, transcription, preparation and administration.

Nutritional care should be provided in a sequence that covers distinct interrelated steps called a nutrition care process, and something important after these steps is the monitoring of nutritional therapy.

Documentation should be provided for nutritional risk screening, diagnosis, assessment of risk factors, nutritional needs, nutritional therapy, goals and outcomes.

Regarding the organization of nutritional care in hospitals and care institutions, we can say that they are divided into several sectors with different specificities. The success of parenteral nutritional therapy depends on the preparation and administration of a safe nutritional mixture that ensures optimal stability and bioavailability during infusion, that way the different guidelines support the importance of professionals in the safety and quality of these products.

In conclusion, there are several forms of nutritional care, among them the meal environment, diets, clinical nutrition therapy and palliative nutrition, inserting our theme in clinical nutritional therapy.

**Keywords:** Parenteral nutrition; Clinical nutrition; IV admixture

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## HOSPITAL PHARMACY ORGANIZATION

***Mariana Esteves, Rita Santos, Tatiana Almeida, Vânia Soares***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

The Hospital Pharmacy is a specialized department, whose main purpose is to provide medicines and other health products to the hospital where it's installed. The objective of this work is to inform about Hospital Pharmacy Organization and the respective functions.

The Hospital Pharmaceutical Services (HPS) are responsible for the management (selection, acquisition, storage and distribution) of drugs and of other pharmaceuticals, for the implementation and monitoring of drug policy defined in the National Hospital Medicinal Form and by the Pharmacy and Therapeutics Commission, for the management of the experimental medicinal products and the devices used for its administration, as well as other drugs already authorized, necessary for carrying out the tests.

Regarding the location of the HPS, they should have ease internal and external access, proximity to vertical circulation systems and all areas, including warehouses, should be located on the same floor. The HPS are constituted by different functional areas: selection and acquisition; reception and storage; preparation; control; distribution; information; pharmacovigilance, pharmacokinetics and clinical pharmacy.

The HPS has several functions such as: selection and acquisition of drugs, pharmaceuticals and medical devices; production, supply, storage and distribution of drugs and other health products; analysis of raw materials and finished products; participation in Technical Commissions; collaboration in the elaboration of therapeutic protocols; participation in clinical trials; collaboration in the prescription of parenteral nutrition and its preparation; drug information, between others.

Therefore, the hospital pharmacy organization is a complex system that includes several sections and functions to ensure pharmaceutical requirements.

**Keywords:** hospital pharmacy; organization; pharmacothecics

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## THE HOSPITAL PHARMACY TRENDS

***Bárbara Faro, Carolina Almeida, Cátia Silva, Cristiana Coutinho, Daniel Figueiredo***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

The hospital pharmacy is a service with a huge contribution to the provision of hospital health care services. It has also accompanied all the technological, scientific and demographic evolution during the last years.

This work intends to approach generically the evolution of the hospital pharmacy in the last decades.

We performed a bibliographic search from the online data base PubMed and Google Scholar using the following keywords: "evolution of hospital systems", "trends and hospital pharmacy" and "drug evolution".

As an autonomous and independent hospital service, the pharmacy really comes from the 60's. In the specific case of Portugal, its regulation is defined in 1962 and is truly implemented in hospitals in the 70's.

In the beginning the hospital pharmacy had a large storage and production role of medicines depending on the needs of the hospitals where it was. Automation was almost non-existent and the unit dose system existed in very few hospitals. As well as information systems that were rare. With the development of society in general and health care in particular, the pharmacy took on other functions and became more complex, becoming more focused not only on the medicine but also on the patient and their needs.

With the advance of knowledge also the pharmacy as evolved itself with new drugs, more technology, like their disposal automation, robotics, intelligent infusion pumps and computerized order entry( CPOE), assisted by bar codes and more requirements at all levels. This places the hospital pharmacy services and its professionals facing major challenges in the future.

**Keywords:** hospital pharmacy, hospital systems, drug evolution

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## MEDICATION ERRORS

***Andreia Rodrigues, Ercília Mondlane, Inês Figueiredo, Luís Reis***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Medication error means any event that may cause harm to the user or result in inappropriate use of the medication when it is under the responsibility of health professionals, the patient or the consumer.

This work pretends to present the main errors of medication in hospital context and to approach new measures to avoid them.

The medication errors are grouped into four levels: no error, no harm to the patient, error with damage to the patient and error that can cause the patient's death. Subsequently, medication errors can be of several types, the most common being caused by the administration of the wrong medication, the wrong dose medication, and the wrong medication.

Regarding the frequency of medication errors, this is due to the complexity of care. In Hospitals the process of drug use consists of several steps involving several professionals, each presenting possibilities for error. However, there is a significant variation in rates of medication errors reported due to different definitions of medication errors. A study carried out classified the most frequent medication errors in hospital environments by the phase of the drug use process: Order, Transcription, Delivery and Administration.

Identifying and correcting glitches is important to reduce error rates, starting with getting a system for all members of the care team, as everyone must immediately identify and report any errors that have occurred. Basic principles of prevention include: communicating values and expectations, designing safety systems, managing behavior choices, creating learning systems, and creating a fair and responsible environment.

**Keywords:** Medication Errors; Hospitalar Pharmacy; Prevention

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## THE COST OF THE PATIENT IN HOSPITAL

***Inês Alves, Kelly Correia, Luís Ferreira, Mariana Carreira***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

When a patient goes to a hospital, he wants to be treated according to his needs. Costs in a hospital involve all areas that are intended for patients such as: bedrooms, nourishment, pharmacy, laboratory and others.

In this context, we aim to address patients' costs in a global context in a hospital setting.

It has been proven that in hospitals with major procedures, hospitalization takes up 47% of hospital expenses and the pharmacy service occupies 12%. In hospitalization, there are variables that interfere with these expenditures: age of the patients, diagnosis category and diagnosis. In a hospital with fewer procedures, the hospitalization occupies 53% of the expenses, whereas the pharmacy occupies 18%.

Circulatory situations were responsible for greater costs, followed by musculoskeletal (14%) and respiratory (11%) conditions. Digestive conditions, nervous system conditions, infectious and parasitic diseases and pregnancy-related conditions were less costly (5% - 9%).

The hospitalization rate is an important factor in the cost growth, from which were classified as the most expensive: acute and unspecified renal failure, septicemia, osteoarthritis and respiratory failure.

Studies have shown that cost variations in hospitals can reduce these costs without sacrificing quality of care. It can be said that low-cost hospitals have better management and are more likely to have better quality care.

In conclusion, higher spending is not always associated with a higher quality of services and one of the main objectives of a hospital will be to provide better services to the patient with minimum costs.

**Keywords:** costs; hospital; hospitalization; patient

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## PHARMACY DISTRIBUTION SYSTEMS IN HOSPITAL PHARMACY

**Ana Luisa, Adriana Sousa, Ricardo Santos, Rita Gonçalves**

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

The purpose of Hospital Pharmaceutical Services is to set up "Hospital Pharmacy activities". This Hospital Pharmacy guarantees the medicinal therapeutics, quality, efficacy and safety of the medicines, integrates the health care teams and promotes actions of scientific research and teaching. They are responsible for the management of the medicine and other pharmaceutical products.

The objective of the study is to approach the distribution of drugs at a hospital level.

The distribution of medicines is a function of the hospital pharmacy that makes available the right medication, in the right quantity and quality. In the 1960s, hospital pharmacists presented a new system: the unit dose, capable of reducing the incidence of medication errors.

The main distribution systems are divided into two groups: Traditional and Modern.

The first includes collective, individualized and mixed or managed stocks. The Modern is constituted by the system of unit dose, personalized and replenishment of stocks.

Although greater safety and efficacy in SDMDUs is recognized, there is sometimes a reluctance to implement this system because of the increased cost to the hospital. However, several studies have shown that the cost to implant it is quickly offset by the reduction in drug consumption and the length of time nursing has to devote to drug-related tasks.

In recent years the growth of automation in the hospital pharmacy has allowed a reorganization of the pharmaceutical services, having a great impact in the distribution systems of medicines, contributing significantly to a reduction of errors, costs and work.

**Keywords:** Distribution Systems of Medicines; Hospital Pharmacy; Quality in Pharmacy

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## **SOCIAL RESPONSES FOR THE ELDERLY - FRAMING**

***Beatriz Pais; Filipa Janicas; Marta Batista***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

It is considered a residential structure for elderly people, the establishment for collective accommodation, temporary or permanent use, in which social support activity and nursing care are developed.

The Residential Structure for the Elderly allows the autonomy, independence, freedom, identity, integrity, respect, privacy and comfort of the elderly, being able to access biopsychosocial support services, oriented to the promotion of the quality of life and to the conduction of an aging healthy, autonomous, active and fully integrated.

This paper aims to explain in a simplified way some aspects in which their presence has to be verified so that there are adequate services to the needs of the residents who enjoy the institution, promoting their health as well as that of their workers.

For the execution of this work a technical file and a checklist duly organized in important sectors were verified in the verification of the conditions of a Residential Structure for the Elderly, based on several legislations more precisely Law Decrees and Ordinances. In this way it is possible to easily carry out a survey in order to point out all possible errors in the Residential Structure, with the help of the technical file.

**Keywords:** Residential Structure; Elder; Respect; Aging; Comfort.

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## LICENSING AND FUNCTIONING OF HAIRDRESSERS

***Bryan Rodrigues, Carolina Coelho, João Xia, Nádía Ulisses***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Currently, a hairdresser is by definition an establishment where workers perform cuts, hair treatments and beauty treatments, such as hair removal, manicure, pedicure, among other things. A hairdresser or a barber is a person who has the job of cutting, combing, painting and doing hair treatment for clients.

In order to carry out this work, we have searched for several laws, more precisely decrees of law and ordinances, to proceed to the accomplishment of a technical file and a checklist, to be carried out an inspection to an establishment in the future of hairdressers.

To be able to exercise its function, a hairdresser must be in accordance with the legislation destined to these, and must have the requirements that are in the decrees of laws and ordinances to be able to carry out its activity. They should also be competent to ensure the health and safety of their workers by providing their diligent safety equipment such as gloves when they use products in their clients' hair and non-slip footwear in order to avoid falls.

In order to be able to operate, these establishments must meet all the requirements to be open, such as buildings to ensure the strength, endurance and safety of their workers in order to ensure their safety. The premises of these establishments must be in a good condition in order.

**Keywords:** hairdresser, law decrees, ordinances, safety, safety

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## **PUBLIC AND PRIVATE HEALTH FACILITIES – TECHNICAL AND FUNCTIONAL REQUIREMENTS**

***Bárbara Ascenso, Bárbara Santos, Carolina Duarte***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

The National Health Service integrates all the public services and entities that provide health care, namely: clustering of health centers, hospitals regardless of their designation; the local health units. The private establishments play a relevant role in the coverage and quality of health services, both in a complementary perspective to the National Health Service (NHS) and in an additional perspective.

This work aims to present the conditions and characteristics that public and private health institutions must have according to current legislation.

For this, it was carried out a research in the legislation for the accomplishment of a technical file on the subject (Law Decree no. 13/93 of January 15, Regulatory Decree no. 63/94 of November 2).

In this tab, it is possible to observe the characteristics of establishments in various parameters such as location, access, traffic, services (mortuary house, pharmacy, hospitalization unit of patients, urgency, operative block, intensive care unit, obstetrics, external consultations, washing and ironing clothes used, hospitalization of contagious infectious and food confection). In addition, with this to be able to evaluate the conditions of the establishments.

With this work, it was concluded that despite the administrative differences between the public and private sectors, the conditions necessary for the health sector to operate both have to be equivalent despite being presented in different legislative norms.

**Keywords:** law, health units, public, private

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## LICENSING AND FUNCTIONING OF CAMPSITES

***Daniela Canas, Francisco Fernandes***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Campsites are tourist developments. They may be public or private individuals according to whether they are intended for the public or beneficial to their respective owners or explorers and are regularized by the following diplomas: decrees of law 38/2009 and the decree regulation 33/97.

For localization, account should be taken of Article 4 (1) of the abovementioned regulatory documents and verify characteristics such as: moisture and infiltration of the ground, if there are sewers and finally the level of air pollution.

It is also necessary to comply with the regulations: general health and safety technical standards to improve the accessibility of people with disabilities, reduced mobility and general noise regulation.

Its operation depends only on the ownership of the license or tourist use. The installation of the infrastructures and, in general, of all the equipment

necessary for the operation of campsites and caravan sites should be carried out in a that no noise, vibration, smoke or odors are likely to disturb or in any way affect the environment of the campsites.

In conclusion, it is part of the role of the environmental health technician to ascertain through surveys whether tourism enterprises comply with the standards in the following areas: water intended for human consumption, domestic hot water, waste water, waste, sanitary facilities, food and beverage establishments, first aid station, playground and, finally, hygiene and health at work safety.

**Keywords:** Tourist Developments; Operation; License; Health

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## LICENSING AND OPERATION OF A BUTCHERY: GOOD PRACTICE

***Mariana Martinho, Luís Marques, Inês Simões, Ana Isabel Sousa***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

For an establishment to be in operation it is necessary to comply with some norms and objectives stipulated by law, such as the specialized retail trade in food products, and in this group are establishments specialized in the sale of a particular food. Butchery can be defined as a commercial establishment or sector of a large area where fresh or frozen meat is cut and sold, retail.

The objective of this work is the elaboration of a technical file that aims to evaluate, in a Food Establishment: Butchery, these norms and objectives. The method used to perform the same was the research of laws, standards and other technical sheets already elaborated and related to the theme.

In this technical file we take into consideration the following points: type of establishment and its definition, main normative and legal provisions, licensing, financing, human and material resources, general description of buildings and conditions of installation and operation.

Concluding there are several evaluation parameters to these establishments being these rigorous. When they are not met, a deadline is given for compliance, if not respected, a fine will be imposed by a supervisory entity.

The legal diplomas that frame the establishment that we were given are: Decree-Law No. 10/2015 of January 16; Ordinance no. 131/2011 of April 4; Ordinance no. 284/2012 of September 20; Decree-Law no. 48/2011 of 1 April; Ordinance no. 239/2011 of June 21; Ordinance no. 206-A / 2015 of July 14; Ordinance no. 206-C / 2015 of July 14; Decree-Law no. 156/2005 of 15 September; Decree-Law no. 147/2006 of 31 July.

**Keywords:** Butchery, Evaluation, Establishment

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## HABITAT FACTSHEET – NURSERY SCHOOL AND KINDERGARTENS

**Ana Santos, Carolina Suzano, Mariana Sousa**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Nursery school and kindergartens are for the most of the time occupied, not only by workers but also by children, during a significant time of exposure being therefore an area of fundamental occupation where occupants are exposed to specific risk factors which require special attention in the context of Public Health and Hygiene and Safety at Work. In this sense, a bibliographic review was done in order to understand and study the normative legal framework, developing working tools to support observation studies made by the Environmental Health Technician.

The main legal and regulatory Portuguese provisions are: Administrative Rule No. 262/2011 (establishes the regulatory norms of the conditions of installation and operation); Decree-Law no. 33/2014 (defines the legal regime for the installation, operation, and supervision of social support institutions managed by private entities, establishing the respective administrative regime); Decree-Law no. 163/2006 (concerning the accessibility of buildings); Decree-Law no. 136/2014, (establishes the Legal Regime of Urbanization and Edification); Law No. 46/86 (Basic Law of the Educational System); Directive 2009/48 / EC (establishes safety standards for toys and teaching materials).

The work carried out by the Environmental Health Technician is crucial, not only with regard to Public Health and Hygiene and Safety, but also for the development of the activity and operation of the installations, with the objective of promoting the quality of life of the users, as well as and the environment in general.

**Keywords:** Kindergartens, Nursery school, Environmental Health, Health Promotion.

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## LICENSING AND FUNCTIONING OF PLAYGROUND

**Beatriz Soares, João Lima**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Habitat Management is a curricular unit that allows the acquisition of skills that lead us to better understand and to have a critical reflection on the relationship of Man with the natural habitat.

One of the several qualifications of an Environmental Health Technician in the area of habitat is the preparation of opinions on location and projects of collective use spaces, namely swimming pools, bathing areas, holiday camps, recreation and rest areas or entertainment and fun. In this way, did a technical file about Playgrounds.

According to Decree-Law 203/2015, 2015-09-17, Playgrounds are places for the playful activity of children where motor activity is important and, by their nature - and if well designed and well maintained - are a healthy and attractive choice. For this reason, it is fundamental to create spaces of play and recreation with quality. Children also complain about challenging spaces with acceptable, different, stimulating doses of risk, where they can play in total freedom with their friends, siblings, parents and grandparents. For this to happen and the conditions of health and safety that these spaces require are guaranteed, it is necessary to comply with several requirements that comply with the legislation in force.

The legislation for Playgrounds, analyzed from different angles, the technical norms applicable to these spaces and also the good practices in the maintenance and conservation of spaces and materials are some of the themes that will be approached throughout this work.

**Keywords:** Habitat Management, Environmental Health Technician, Playground

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## LICENSING AND FUNCTIONING OF HYDROTHERAPEUTIC POOLS

***André Sena, Cristina Trigueiro, Joana Albuquerque***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Swimming pool is a part or set of constructions and facilities that includes one or more tanks for bathing purposes, recreational, formative and therapeutic activities. They are also places that require attention to the sanitary conditions, in particular of the quality of the water, since its users also constitute a danger being a means of transmission and propagation of diseases.

The Environmental Health Technician performs functions in the area of sanitary surveillance of water systems for recreational use, with the purpose of promoting basic sanitary protection and fight against means and agents of disease transmission.

In order to carry out the present study, which focused on the hydrothermal pools, we proceeded to the bibliographic research analyzing the norms and legislation in force, namely the “ Circular Normativa da DGS nº 14/DA de 21/08/2009, Diretiva CNQ no23/93” , about quality in swimming pools for public use, Decree-Law no. 65/97, which contains the manual of good practices in physical medicine and rehabilitation and Administrative Rule 1212/2010, which establishes the minimum requirements for organization and operation, human resources and facilities techniques. In this area, Environmental Health technicians ensure and elaborate opinions and contribute to the development of these activities, in particular the health, hygiene and safety issues at the work of the stakeholders, with the main point being the maintenance of good practices promoting general well-being.

**Keywords:** Hydrothermal pools, environmental health technicians, public health, habitat management

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## USE OF WATER FOR HUMAN CONSUMPTION – GOOD PRACTICES

***Bárbara Ascenso, Bárbara Santos, Carolina Duarte***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

The essential role of water for human survival is from general knowledge nowadays. At the same time, it has known that its availability in nature has been insufficient to meet the needs in many regions of the planet, a phenomenon that is becoming increasingly serious. Water should not be wasted, polluted or poisoned. That is, it has must be use made with conscience and discernment to avoid situations of exhaustion or deterioration of the quality of the reserves currently available. With this work, we intend to evaluate the level of knowledge of the good practices of water use in the ESTeSC students' community and to raise awareness of these good practices of use. It was done a bibliographic research on the subject and was then applied a questionnaire to the population chosen for the study, where they were to address some of the good practices of water use.

It was possible to verify from the study that the respondents opt for good practices of water use. For example, 97.4% opt for quick showers, 81.6% always close the faucet when brushing their teeth, 89.5% use the full carry machines, and everyone considers drinking water on the planet to be of great importance.

With this work, it was possible to conclude that, in general, the students of ESTeSC adopt good practices in the rational consumption of water, being aware of what they must do to continue its preservation, in qualitative and quantitative level. However, it is still necessary to improve certain practices since in some actions there is a poor use of water.

**Keywords:** Water, Good habits, Preservation

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## WATER CONSUMPTION HABITS OF THE PORTUGUESE POPULATION

***Carolina Coelho, Filipa Janicas***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Water for human consumption should not contain a pathogenic micro-organism and should have a physico-chemical composition that does not endanger the health of the consumer due to the induction of deficiency states, which may result in situations of acute or chronic toxicity.

In order to know the water consumption habits of the Portuguese population and to understand the factors that influence the different consumption habits in relation to the quantity and type of water consumed in the same population, a bibliographic review was carried out through studies in other scientific articles on the subject.

An online survey was applied to the entire age group of the population to evaluate the water consumption habits to which 85 responses were obtained. Data analysis showed that most of the respondents (67.1%) consumed tap water (from the supply network) and that the remaining ones (30.6%) consume bottled water, which means that most of our population has confidence in the water quality of the network.

One of the current challenges to sustainable consumption is to estimate changes in attitude and behavior in world society, as our intellectual, moral and cultural capacities impose responsibilities on all stakeholders.

**Keywords:** Water, Health protection, Water consumption, Natural resource

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## EFFECTS OF UNTREATED WASTEWATER ON THE ENVIRONMENT

***Francisco Fernandes, João Xia, Luís Marques***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

In the coming years, the world will continue to face some water shortages, and therefore its needed some management. There is an urgent need to change the way water resources are used and managed in order to achieve the Sustainable Development goals.

In order to carry out this work, and taking into account the theme and its importance, the following objectives were established: Introduce the notion of how we can save water in day-to-day activities; Analyze and evaluate the water management that people have in their home.

The methodologies used were bibliographic research on the subject and a questionnaire was applied to evaluate the level of knowledge and practices on wastewater treatment. A shocking fact has to do with the operation of equipment outside the law, since only 1,704 of the 2,743 existing sewage water treatment had a valid discharge license in 2016, which means that 38% of sewage water treatment are operating illegally.

The surveyed population 85% knows what the acronym ETAR means. 88% of the population knows that untreated wastewater will influence surface water and groundwater, the remaining 12% think it will only influence one of them. 73% of the respondents know that the waste water from their homes is treated, 15% do not know if they are treated or not and 12% know that the water is not treated. In the last question, 73% of the population surveyed know which ETAR is closest to their area of residence.

It is concluded that in the population surveyed there are still houses without being connected to the public wastewater network, we can also conclude that the general population knows the risks that will lead to wastewater without treatment for the environment.

**Keywords:** Water Resources, Sustainable Development, Waste Water

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## **WATER AS A CAUSE OF DISEASE**

***Daniela Canas, Isabel Sousa, Nádía Ulisses***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

The right to water and sanitation, are part of the minimum conditions to enjoy a life with dignity. Although in Portugal measures have been implemented to improve the sanitation network and water quality, which have had positive effects, the same case does not happen in other parts of the world. Countries that struggle with war or that their geographical position is not greatest, have high mortality rates due to lack of water or lack of treatment.

A bibliographical research and the application of a survey to evaluate the level of knowledge of the population about the contamination of the waters, their consequences on health and environment, as well as mentioning situations where contaminations occurred and, finally, to recognize the procedures that the population adopts in case of contact with contaminated water.

It was thus obtained that: 26.7% of the respondents even knowing that the water will not be viable for bath, continue to use it. Also 9.9% of them claim to continue drinking water even when it is not potable. Although contradictory most individuals know that drinking or using contaminated water has consequences and it adds that, they can mention some pathologies. There is a positive side, that is, 97% of respondents never had a pathology caused by contact / water consumption.

In conclusion, it is important to know and understand what aspects should be improved and how it can be strengthened to alert the population to the dangers of contaminated water.

**Keywords:** Water, Sanitation, Environment, Contamination, Pathology

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## WATER AND CLIMATE CHANGE - POPULATION PERCEPTION

***Bryan Rodrigues, Marta Batista, Rita Rodrigues***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

The growing role of climate change as its worsening has proven its continuing impact on the hydrological cycle. Being this a global problem, it is necessary the effort of all and the sensitization of the population to the theme.

The objective of this study was to understand the population's perception of climate change and its relationship with water quality and quantity.

The methodologies used were the collection of information from a questionnaire published online and the analysis of text of scientific articles related to the topic.

The results were obtained through an inquiry subjected to 48 individuals about their perception of the effects of climate change was found that 55.6% answered that the climatic changes have "a lot" impact on health, 51.2% responded that "maybe" the climatic changes are solely caused by humans, 70.4% replied that Portugal suffers "little" from climate change compared to the rest of the world , and only 29.9% responded that their day-to-day attitudes affect "little" the global warming while another 37% responded that "climate change" might be serious enough to cause death.

With this work, it is concluded that a large part of the population has knowledge about climate change and its possible impacts on the quantity and quality of water.

**Keywords:** Water, Climate change, Perception

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## **SUSTAINABLE WATER RESOURCES MANAGEMENT**

***Beatriz Soares, João Lima***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Water is one of the most valuable natural resources for the human being and therefore requires special attention on its use and protection, since the society develops around and on this resource. Water covers about three-quarters of the earth's surface and the area of the planet that is not filled with water has a diversity of habitats that depend on it. It is unmistakable that the planet's water resources are running out quickly and that, in addition to the pollution of rivers, irresponsible consumption and without sustainable rationale in economic development, are relevant causes in water reduction. There is therefore a need for sound management of this resource, sustainable management that meets the needs of present generations, but without compromising the needs of future generations.

In this work, a bibliography research was carried out on the subject and a questionnaire was applied on the sustainable management of the water resources of the population of Portugal. Regarding the results of the questionnaire, it was obtained that about 12.5% did not close the tap while brushing their teeth. However, 87.5% close the tap while brushing. Also, it was observed that approximately 72.5% of the population only use the dishwasher and the washing machine only when they are full, however 27.5% do not.

The results obtained allow to conclude that the majority of the studied sample already refers to behaviors that demonstrate a good management of water resources. However, there still seems to be a need for greater awareness of the issue and consequent change in some habits.

**Keywords:** Water resources, Sustainable Management

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## **WATER FOR HUMAN CONSUMPTION - LEVEL OF CONSUMER CONFIDENCE**

***André Sena, Cristina Trigueiro, Joana Albuquerque***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Water represents an essential good for life, and should therefore be accessible to the community, and present potable conditions such as being clean, clean and free of any danger to public health. About 70% of the surface of the planet Earth is covered by water, but only 1% of water remains available for human use. According to the World Health Organization in 2015 about 663 million people do not have access to safe drinking water in a sustained way and 2,400 million do not have integrated health systems. With this work we intend to determine the level of confidence that consumers have in relation to the water that arrives for consumption from the public supply system, as well as to identify situations of risk that may exist. A bibliographical research on the subject was carried out and a questionnaire was applied to the Portuguese population. It was found that 86.8% of the respondents considered that the water that arrives for the supply is of good quality, but only 78.2% knows where it comes from. Of the respondents, 61.8% are unaware that they can become contaminated when consuming tap water, thus accounting for more than half of the population surveyed. Of the 38.2% who have a notion that water may be contaminated, about 13.3% gave examples of pathologies: cholera, typhoid, legionella, diarrhea, hepatitis and gastroenteritis. We conclude that water from the country's public water supply system is of good quality despite people's lack of information about their treatment and drinking water.

**Keywords:** Human consumption, Essential, drinking water

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## WATER QUALITY IN AQUIFERS AND CONSEQUENCES IN HUMAN CONSUMPTION

***Beatriz Pais, Maria Simões, Mariana Martinho***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

For a good quality of groundwater for human consumption it is necessary to have a good waste management and a notion of its use, since this is not an infinite resource, as many people think. The objective of the study was to estimate the level of knowledge of the population regarding the provenance of the water that arrives at their taps, if they think that it has poor quality and why, and also know the term aquifer (considering that much of the water supply is of underground origin).

For that, an online questionnaire was applied to the population and a research was done on articles previously made.

In the study sample, a total of 63 respondents, 77.8% are aware of the origin of water, and 65.3% say that they come from surface waters and the remaining 34.7% from groundwater. Regarding water quality, 82.5% consider it to be of good quality. Of the 17.5% who consider water of poor quality, they give as justifications the fact that they have a flavor (60%), have color (20%), have a smell (6.7%) and another reason (13.3%). Regarding the definition of aquifer 85.8% have a notion of what it is while the remaining respondents are not aware.

In conclusion, the population must dramatically change its behavior so that the bodies of groundwater do not run out and maintain a good quality.

**Keywords:** Water quality, Aquifers, Human consumption

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## **IMPACT OF URBANIZATION ON THE HYDROLOGICAL CYCLE:PERCEPTION OF THE PORTUGUESE POPULATION**

**Ana Santos, Carolina Suzano, Mariana Sousa**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Humanity, with the occupation of geographical space has influenced changes in the environment. "Cities are today the greatest example of environmental degradation, putting in risk the safety and the life quality and creating a stage of ecological damage."

Currently, one of the elements of divergence and subject of debate is the issue of the water resources, especially in urban areas, which prove to be conducive to triggering environmental deterioration processes.

The hydrological cycle, in natural conditions, can be considered an equilibrium system. However, with urbanization are noticed changes that modify the dynamics of the cycle. In urbanized areas, factors such as: waterproofing of soils, channeling river courses and removal of vegetation, trigger or aggravate erosion and flooding processes.

In this article, a bibliographic research was made about the theme and a questionnaire was applied about the knowledge and perception of the changes in the hydrological cycle in urban areas, to the Portuguese population.

In the questionnaire, was obtained that approximately 91.4% of respondents recognize the influence of the urbanization on the hydrological cycle. It was also observed that, 57.8% of the population shows dissatisfaction with the measures adopted by the entities responsible for territorial planning. There are also some discrepancies related to the preservation (or not) of the water lines, since 54.1% of the respondents affirm that they are preserved, but 45.9% reveal the opposite.

In conclusion, the percentages for appropriate knowledge are suficiente, demonstrating that the Portuguese population is well informed.

**Keywords:** Hydrological cycle, Urbanization, Environmental Impacts

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## DEMYELINATING DISEASES

***Bárbara Figueiredo, Bárbara Andrade, Diogo Maia, João Ferreira, Raquel Pereira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisioterapia, Coimbra, Portugal*

### Demyelinating diseases

Myelin is a part of the Central Nervous System, it's constituted by glial cells called oligodendrocytes, being the main role of this structure is to isolate the axon. The information who comes from our brain can arrive to our nervous cells quickly without losing power.

As far as we know, autoimmune diseases start with a disorder in the immune system. In the case of myelin, some defence cells identify it as an enemy substance and begin to attack it. The damage done to the myelin prevents the message from the brain from reaching to other parts of the brain and the body.

Multiple Sclerosis (MS) is a chronic inflammatory and primary demyelinating disease of the Central Nervous System. The lesions characteristic of the disease consists on focal areas of large demyelination, called plaques. The term "demyelination" therefore refers to the loss of myelin, that is, the sheath which, under normal conditions, involves the nerve (axon) extensions of the neurons.

MS is an autoimmune disease in which self-reactive T lymphocytes play a determining role. Inflammatory reactions and all underlying immune processes cause persistent lesions not only in the oligodendrocytes and myelin, but also in the axons themselves, causing profound changes in the conduction of nerve impulses. The accumulation of these hyperreactive cells in the CNS also contributes to the dysfunction of the blood-brain barrier, which in patients with MS becomes much more porous and fragile.

This disease leads people to lose their natural hability of walking, gesticulate, and move because the message doesn't arrive to the muscle.

**Keywords:** Nerves, Demyelinating Diseases, Axon, CNS

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## CHRONIC PAIN

***Inês Cardoso, Rúben Pais, Rúben Salteiro, Sofia Ferreira, Tiago Dias***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisioterapia, Coimbra, Portugal*

“...Dor é definida como sendo uma experiência sensorial e emocional desagradável, associada a uma lesão tecidual ou potencial ou descrita em termos de tal dano”.

Unlike acute pains, chronic pain is not related to warning signs (punctual symptoms). Chronic pain is more than a symptom, it is the disease that persists. It does not disappear after the healing of the lesion or is related to chronic pathological processes. Its manifestation is disturbing and leads to several changes at the physical, psychic and social level.

The main difficulties in assessing, treating and controlling pain are the lack of knowledge on the subject.

Chronic pain does not have a cure, however, there are treatments to attenuate it, like opioid analgesics, morphine, targeting the neuronal opioid receptors. These receptors, that are activated by inhibitory neurotransmitters, produce responses of insensitivity to pain, which block the transmission of painful signals to the Nervous System (the endorphins). The mechanism that regulates this influx of painful impulses at the level of the spinal cord, is called the gate mechanism. In the absence of pain, the gate mechanism operates through inhibitory neurons (post-synaptic inhibition) that produces an higher intensity stimulus than the intensity of pain.

When a painful signal is too big that surpasses the threshold of pain, the inhibition is blocked and the information of pain passes through the spinal cord until the cortex which causes the feeling of pain.

In chronic pain evaluating regular physical, sociocultural components and emotional status can be the most important aspects.

**Keywords:** chronic pain; attenuate; gate mechanism

## HORMONAL FUNCTION OF BONE: OSTEOCALCIN

***Beatriz Penas, Inês Martins, Inês Mateus, Maria Margarida Marques, Mariana Ferreira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisioterapia, Coimbra, Portugal*

### Hormonal Function of bone: Osteocalcin

The bone is a live connective tissue, not flexible and highly specialized that composes the bigger part of our skeleton. Contrary to what everyone thinks, our bones not only suffer hormone action but also produce hormones by themselves, being osteocalcin an example of this.

Osteocalcin is a peptide secreted by osteoblasts, which are cells involved in the formation of bone tissue. It's one of the most abundant non-collagenous proteins, being constituted by forty-nine amino acids, three of them (positions seventeen, twenty one and twenty four) composed by gamma-carboxyglutamic acid – whose presence gives it the power to bind to calcium and to crystals of hydroxyapatite. It is noteworthy that an increase of the calcium concentration is directly proportional to the increase of osteocalcin concentration, which is related with the beginning of the mineralization process.

This hormone operates in cases of diabetes and fertility when it's released into the circulation. Relatively to the first example, osteocalcin stimulates the production of insulin and increases the sensibility to this peptide hormone in fat and muscular tissue. This interferes in the way we metabolize sugar and fat, consequently reducing the values of glucose in the blood and protecting the body against obesity, which is due to increased energy expenditure. Increased fertility is propitiated by osteocalcin due to the fact that it potentiates testosterone synthesis in the male gonads, promoting the maturation and preventing apoptosis of germ cells.

Concluding, osteocalcin is a hormone with that influences pathologies as diabetes and obesity as well as male fertility.

**Keywords:** Osteocalcin, hormone, bone

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## ELECTROCARDIOGRAPHY

***George Burnham, Hugo Henriques, Lília Costa, Pedro Alexandre***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisioterapia, Coimbra, Portugal*

Electrocardiography (ECG or EKG) is a quick, practical and safe process. In physiological terms, an electrocardiogram registers the electrical potential difference between two points of the body, which is generated by the subsequent depolarisation and repolarisation of the heart cells.

Irregularities in an electrocardiogram can be the sign of innumerable health problems, making it possible to diagnose arrhythmias, acute myocardial infarction, among many other issues.

Electrodes are pads that are attached in various locations on the human body. A pair of electrodes, referred to as a lead, are used to measure said electrical potential difference between two of these locations. 10 electrodes are usually used to form 12 ECG leads. These leads can be arranged into three types: limb, augmented limb and precordial. There are three limb leads (D1, D2, D3), which form Einthoven's Triangle, and three augmented limb leads (aVF, aVL, aVR), which use Goldberger's central terminal as their negative pole. Finally there are six precordial leads or chest leads, which use Wilson's central terminal as their negative pole.

The P waves are the first of the cardiac cycle, and they represent atrial depolarization (contraction of the auricles), and they are normally positive in all of the leads. The QRS complex portrays the depolarization of the ventricles (contraction of the ventricles), which presents different morphologies depending on the lead. The T wave shows the repolarization of the ventricles, generally being positive. There also exists a low voltage U wave, which is usually seen in precordial leads.

**Keywords:** Depolarisation, repolarisation, electrocardiogram, electrodes

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## PHYSIOLOGY OF BONE REABSORPTION: VITAMIN D, CALCITONIN AND PTH

***Dália Ferreira, Diana Seabra, Luan Marques, Margarida Vilarinho, Patrícia Nunes***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisioterapia, Coimbra, Portugal*

Bones are in a constant process of degradation and construction. These two processes are directly related to the calcium ( $\text{Ca}^{2+}$ ) regulation. The concentration of this ion is controlled by two types of cells: osteoblasts and osteoclasts (which are in charge of bone construction and destruction, respectively). In homeostasis, the activity of osteoblasts is equivalent to the activity of osteoclasts, which means that the amount of calcium leaving the bone is the same amount of calcium going into the bone.

When the concentration of this ion in blood decreases, the activity of osteoclasts increases, causing greater bone destruction and, consequently, the passage of calcium from bone to blood. In contrast, when the concentration of calcium in the blood increases, the activity of osteoclasts decreases, resulting in a reduction of calcium being transferred from bone to blood.

The parathyroid hormone (PTH) is the main regulator of the calcium concentration in blood. When this ion's concentration in blood decreases, this hormone (PTH) has three important roles: stimulation of bone degradation, production of vitamin D (responsible for the absorption of calcium in the small intestine) and the reabsorption of this ion in kidneys.

Calcitonin is also a regulatory hormone in this process because it induces the decrease of osteoclastic activity when there is a raise of blood's calcium concentration.

In conclusion, the bone is a calcium storage site and the maintenance of its physiological levels depends on organs (small intestine, kidneys and bone), hormones (parathyroid hormone (PTH) and calcitonin) and vitamin D.

**Keywords:** Reabsorption, Calcium, Calcitonin, PTH

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## **AUTONOMOUS NERVOUS SYSTEM AND EXERCISE**

***Daniela Cruz, Carina Santos, Mariana Marques, Myrian Tavares, Gabriela Souza***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisioterapia, Coimbra, Portugal*

Autonomous nervous system (ANS) is the the part of the peripheral nervous system responsible for preserving body homeostasis in an involuntary and subconscious way, along with the endocrine system.

It's divided in: sympathetic which mobilizes the body for the intensive physical activity ("fight or flight") and parasympathetic system that relaxes the body and inhibits or slows down high energy functions ("rest and digest").

When an athlete initiates his physical practice, the sympathetic system is activated, secreting noradrenaline to the alfa-adrenergic and beta 1 receptors, dilating the eye's pupils and also increasing heart rate and force of contraction, raising the blood pressure, allowing bigger amounts of oxygen and nutrients get to the muscular cells for metabolism.

During the exercise, the sympathetic remains active, decreasing the activity in body areas not associated to the exercise, maintaining the energy spent on the current activity and muscular and liver cells are stimulated to degrade glycogen into glucose, increasing energy resources. Meanwhile, adrenal medulla cells secretes adrenaline into bloodstream through beta 1 and 2 receptor, triggering a physiological response by increasing blood pressure contraction, vasodilation and bronchodilation.

After practice, sympathetic's activity decreases and parasympathetic takes action. Acetylcholine is released to muscarinic receptors, relaxing the body, causing changes in the cardiovascular system (vasodilatation, decreased heart rate and blood pressure), in the respiratory system (decreased respiratory rate) and metabolism.

In conclusion, physical exercise helps sustain a healthy ANS by strengthening it and providing the homeostasis of its components.

**Keywords:** Autonomous nervous system, body homeostasis, sympathetic and parasympathetic system, physical activity

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## MUSCLE ADAPTATIONS TO PHYSICAL EXERCISE

***Ana Coelho, Joana Pires, Margarida Ressurreição, Ana Loureiro, Nuno Monteiro***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisioterapia, Coimbra, Portugal*

Muscles, being responsible for the contraction and distention of cells that promote movement, are all made of the same material, elastic tissue and numerous small fibres. There are three types of muscle. Muscle responsible for moving external areas of the body is called "skeletal muscle." Heart muscle is "cardiac muscle". Muscle in the walls of arteries is called "smooth muscle". Regular physical exercise, is a factor that stimulates a series of adaptations on the skeletal muscle. Regarding fibres, modifications in terms of contraction capacity are observed. Generally speaking, muscle fibre types can be broken down into two main types: slow twitch (type I) muscle fibres and fast twitch (type II) muscle fibres. Fast twitch fibres can be further categorized into type IIa and type IIb. Type I fibres use oxygen to generate more ATP for continuous, extended muscle contractions over a long time. Type II fibres use mostly anaerobic metabolism, being better at generating short bursts of speed. Muscle contractions (the movement of muscle fibres in response to force) during exercise can be divided into categories such as isotonic and isometric. It's important to acknowledge that muscle fibres respond differently to different stimuli, hence such categories. Physiological adaptations to physical performance can be acute or chronic. Acute modifications happen in immediate association to exercise, such as increasing of blood flow to muscle tissue. Chronic modifications aim to enhance tissue's mechanical resistance and its functional ability resulting, subsequently, on morphofunctional modifications such as hypertrophy and atrophy.

## MYOKINES - HORMONAL FUNCTION OF THE MUSCLE

***Filipa Soares, João Malojo, Nuno Figueira, Patrícia Rosa Renan, Carlos Fleming, Sofia Branco***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisioterapia, Coimbra, Portugal*

Myokines are proteins released during muscular contraction, since muscles have the ability to act like endocrine organs and perform a hormonal function secreting such polypeptides, which have endocrine, paracrine and autocrine effects in the communication between different organs.

There are so many types of myokines like irisine, LIF, IL-4, IL-6, IL-7, IL-15, BDNF, FSTL-1, myostatin and others.

These proteins have a fundamental role on the human's health and the non-existence of them is one of the main cause of diseases such as atherosclerosis, insulin resistance, decrease in bone formation, type 2 diabetes and so on.

Besides, myokines have a huge anti-inflammatory and analgesic power, and they also take part in the lipolysis process which leads to weight loss.

The muscles along with the brain are the organs who have the biggest number of myokines receptors, what justifies the fact that less active people are usually prone to a higher neurologic degeneration degree and risk of depression.

Therefore, it is concluded that the more intense and varied the physical exercises are, the greater and more diverse will be the myokines produced, which will enable muscular hypertrophy, strengthening of the cardiovascular system musculature, osteogenesis, cerebral strengthening, increasing immune capacity, combating infections, eliminating cancer cells, and preventing numerous degenerative and chronic diseases derived from a sedentary lifestyle.

**Keywords:** Myokines, muscle, endocrine

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## ANGIOGENESIS

***Joana Coelho, Sofia Gaspar, Bruno Fernandes, Joaquim Coelho, João Ferreira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisioterapia, Coimbra, Portugal*

Angiogenesis consists in the development of new blood vessels from already existing ones. This process is managed through the proliferation of the endothelial cells - the cells covering blood vessels. Vasculogenesis is the development of new blood vessels, but it occurs in the embryonic phase (along with other differences in the cells that originate new vessels).

This process happens in response to certain physiological factors. For example, angiogenesis occurs in the process of cicatrizing a wound, or during the maturation of ovarian follicles.

The mechanisms of angiogenesis can be divided in four major steps: First, the basement membrane breaks; Secondly, occurs the migration and proliferation of the endothelial cells; Thirdly, is the vascular tube formation by cytokine stimulation; Lastly, occurs the sediment and maturation of the basement membrane and formation of a new blood vessel.

The deregulation of any of these mechanisms can lead to various pathologies, either by excess or insufficiency of angiogenesis, based on two stimulation factors: Angiopoietins and VEGF (Vascular Endothelium Growth Factor). Angiopoietins will connect to specific receivers to stimulate the connection of the VEGF to the endothelial cells, so that the angiogenesis may occur. The synthesis of the VEGF is induced by hypoxia - lack of oxygen -, and contributes to the reshaping of the extracellular matrix, the increase of vascular permeability and maintenance of the newly formed blood vessels.

Knowing this, we can conclude that angiogenesis can be stimulated and used to treat diseases characterized by poor vascularization, for example the diabetic foot disease.

**Keywords:** Angiogenesis; Vasculogenesis; pathologies

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## **KEFIR: THE ALLY IN THE FIGHT AGAINST CANCER**

***Beatriz Lúcio, Eduarda Carvalho, Joana Mesquita, Rafaela Melo***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

**Introduction:** Kefir is a probiotic product made through milk fermentation and results from mixed-yeast and bacteria that live in symbiosis. It's a food that can be produced from any type of milk and prepared at home or industrially. It has a gelatinous appearance.

**Objective:** Conduct a review article relative to the impact of kefir on human health, namely the influence in different types of cancer.

**Methods:** We conduct a literature review on platforms PubMed, ScienceDirect and Scopus, considering only articles from 2018. That way, we define our search keywords as "Kefir AND Cancer" or "Kefir AND Human Health" or "Kefir Benefits"

**Results:** After a critical review of the various articles we conclude that kefir have antioxidants, antimutagens and anti-inflammatories properties. Therefore, it has the capacity of interact with the various cellular pathways, regulating biological processes such as cellular proliferation inhibition and apoptosis induction. Lastly, it stimulate immune system effector functions.

**Conclusion:** Attending to antioxidants, antimutagens and anti-inflammatories properties of kefir it can be used as a support on cancer therapy as a co-adjuvant.

**Keywords:** "Kefir AND Cancer" or "Kefir AND Human Health" or "Kefir Benefits"

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## **CANNED TUNA - IT'S SAFE?**

***Alexandra Costa, Catarina Grumete, Filipa Santos, Joana Fernandes***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

Introduction: According with the last National Food and Physical Activity Survey, the consumption of fish in Portugal is lower than the consumption of meat. However Portuguese fish consumption is not similar between fish species, being tuna one of the consumer's first choices.

The ingestion of heavy metals, above tolerable dose exhibits several consequences to human health, being fish, in particular fatty fish, for example tuna, a significant food source of these heavy metals.

Objective: Analyze the possible risks associated with an excessive tuna consumption, taking as consideration its methylmercury content.

Methods: Literature review was conducted using the scientific data bases Science Direct and PubMed, using as search expressions "health AND heavy metal AND mercury AND food" OR "excessive AND mercury AND risk\*" OR "canned tuna AND fresh tuna AND metals" OR "heavy metals AND fish". Paper was first selected by title and after by abstract analysis. Published papers before 2010 were excluded from analysis.

Results: 64% of Portuguese population consumes canned tuna, in which the methylmercury concentration varies between 0,01 and 0,20 µg. The upper limit ingestion of methylmercury is 0,1 µg per Kg of body weigh/day. Considering an individual with 70Kg, the consumption above 7 µg of methylmercury a day could lead to toxicity. In this way, only the consumption upward 66,7g of tuna per day exceeds the upper limit of methylmercury.

Conclusion: Although tuna has relatively low methylmercury content, when consumption is excessive, it could result in potentially dangerous levels for public health.

**Keywords:** canned tuna; heavy metals; methylmercury; health risk

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## **CLA - THE ROLE IN OBESITY**

***Bruna Faria, Maria João Silva, Maria Valderrama, Sofia Nunes***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

Introduction: Conjugated linoleic acid (CLA) belongs to a family composed for some isomers of linoleic acid. Mainly, it's found in meat and dairy products of ruminants, being used oftenly, on context of obesity.

Objective: Understand the effects and safety on the use of CLA on obesity.

Methodology: A bibliographic review was made using the Pubmed, Science Direct and Scopus databases, using the expression "Conjugated Linoleic Acid (CLA) AND physical exercise AND obesity". The articles were selected first by title and abstract and later it was made integral reading. Only articles referring to the last ten years have been selected.

Results: The beneficial effects of CLA on health have been studied, and its consumption when associated with physical exercise promotes a reduction of fat mass, increase of skeletal muscle mass and increase of lipid catabolism. Its consumption is also related to a change in appetite that leads to a reduction in the amount of food and total energetic value ingested. Studies also present controversial results regarding the safety of CLA supplementation, such as: increased levels of total LDL and triglycerides and reduction of HDL levels; negative changes in glucose and insulin metabolism, with increased insulin resistance in obese individuals; increased inflammatory markers and oxidative stress.

Conclusion: Although beneficial health effects have already been reported, most of the studies already performed are short-lived and inconclusive, and the safety of the same is questioned.

(Words total: 245)

**Keywords:** Conjugated linoleic acid; physical exercise, obesity

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## PREBIOTICS AND HUMAN HEALTH

***Sofia Antunes, Diana Costa, Bruna Pinheiro, Licínia Oliveira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

**Introduction:** There is growing evidence that the state of human gut microbiota influences health. Prebiotics can be defined as food substances, indigestible by the human being, that promote a good gastrointestinal health when degraded by specific types of endogenous bacteria.

**Objective:** This paper will try to define the effects, towards human health, of ingesting prebiotics during our life cycle.

**Methods:** In this study it was conducted a data base research on PubMedCentral, Web of Science and Scopus (2016-2018) using a linguistic restriction with the key word “prebiotic\*”, having the title as the primary selection criteria. To obtain the articles compiled in this paper, there was a second selection conducted through reading and analyzing each article’s Abstracts.

**Results:** The research showed that introducing prebiotics through the diet in the first years of life helps develop intestinal microbiota and, consequentially, the immune system, helping prevent a multitude of pathologies, in short and long term. The benefits for adults are equally relevant with prebiotics showing modulating abilities on the incidence of Cardiovascular Diseases, Diabetes, Obesity, Gastrointestinal Diseases, amongst others. Dietary interventions containing prebiotics, in the elderly, might also help minimize health complications associated with the inflammation inherent to the ageing process.

**Conclusion:** An adequate dietary intake of prebiotics seems to sustain health benefits, in all age groups.

**Keywords:** Prebiotics; Health; Intestinal microbiota; Diet

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## **MULTIVITAMIN/MINERAL SUPPLEMENTATION: DOES IT MAKE SENSE IN HEALTHY YOUNG PEOPLE?**

***Marta Laranjeiro Pinto***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

Multivitamin/multimineral supplements (MVMS) are among the most popular food supplements used worldwide. Although being recommended as a strategy to correct nutritional deficiencies, their intake is generalized among healthy population, namely younger people.

The aim of this work was to assess the prevalence of MVMS among healthy population, including children/students, and their main motivations. Moreover, the possible benefits and risks of consuming these products was also explored.

This work was based on a scientific review of the literature, published between 2002-2018, using “multivitamin” as main key word.

Irrespective of the continent, approximately half of the adult population takes food supplements, with MVMS being at the top of the list. When looking at children/students, although lower, the percentage of users is still significant. Focusing in university students, MVMS intake is more frequent in health professional graduate courses. Health improvement and disease prevention are the main reasons for taking such supplements. Overall, MVMS were shown to be useful to overcome micronutrient deficiencies, but also led to an ingestion above the recommended intake levels of some vitamins/minerals. Regarding other benefits, the results on cognitive improvement, cancer incidence or cardiovascular disease were generally disappointing. Some of the risks of MVMS supplements are related with the negative impact with prescription drugs and possible contaminations.

As conclusions, MVMS don't seem to be beneficial to the general healthy population, including younger people. In developed countries, efforts should be focused on improving foods habits and nutrition in order to follow the micronutrient intake recommendations by World Health Organization.

**Keywords:** Multivitamin/mineral supplementation, young people, students, health and benefits

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## IMPORTANCE OF CHOLINE PRESENT IN THE EGG IN NEUROCOGNITIVE DEVELOPMENT

**Ana Martins, Ana Pequito, Cátia Bispo, Mariana Cordeiro**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

**Introduction:** Eggs are an important source of nutrients, being one of them choline (293.80 mg / 100g). Choline was not initially considered an essential nutrient due to the endogenous synthesis in small amounts. Choline is involved in three main pathways: acetylcholine synthesis, methyl donation via betaine oxidation, and phosphatidylcholine synthesis. This nutrient it seems to be beneficial in several neuronal functions.

**Objective:** This research aims to understand the relevance of choline present in the egg with neurocognitive development.

**Methods:** Studies were found through the association between choline, egg and neurocognitive development by searching the PubMed, Scielo and Science Direct databases for studies published since 2003 to 2018. After this research, we sort the studies by the title and abstract.

**Results:** The ingestion of choline, particularly in the egg, is important in gestational and nursing women, reflecting on fetal neurocognitive development. This nutrient has an impact throughout life, leading to a lower cognitive and memory decline in old age. It can also prevent degenerative neuronal diseases such as Alzheimer's. However, most of the U.S.A population does not consume the required AI of this nutrient. The bioavailability is increased in the egg because it is found in the form of phosphatidylcholine, being immediately absorbed in the small intestine without suffering any changes.

**Conclusion:** Although it's an area that needs to be explored it is concluded that consumption of eggs and consequently choline is beneficial at the neurocognitive level throughout life. Being the egg an excellent option to achieve the proper daily dose of choline is still undervalued due to lack of information.

**Keywords:** Choline; egg; neurocognitive development

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## PHYTOCHEMICALS AND HUMAN HEALTH

**Ana Sofia Paiva, Beatriz Ferreira, Denise Alves, Joana Proença**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

Introduction: Plants and herbal products have been used throughout history for medicinal purposes. In addition to the nutritional value derived from macro- and micronutrients, plants also contain phytochemicals, non-nutritive components, derived from the Greek “phyto” for plant.

Phytochemicals are biologically active compounds that colour the food derived from plants and herbal products ,that may have potential health benefits, such as epigallocatechin-3-gallate (Green tea), curcumin (Tumeric), capsaicin (Red Chilli Peppers, jalapenos),etc.

Objective: The objective of this article is to understand the influence of phytochemical composition on the health of individuals.

Methods: It was conducted a literature review, using the database ScienceDirect with keywords phytochemicals, finding 47,593 results. It was selected articles between the years 2015-2019, and articles was choose first by title (25) and for the abstract we choose 20.

Results: The use of phytochemicals in skin cancer prevention and intervention is very attractive as these agents are widely available, cost-effective and highly tolerated.

Phytochemicals may not be as effective as conventional chemotherapeutic or pharmaceutical agents, but their potential in cancer prevention is clear. Epidemiological studies state that consumption of phytochemicals is associated with reduced risk of chronic diseases such as cardiovascular disease and type 2 diabetes.

Conclusions: Evidence has indicated that the anti-carcinogenic properties of phytochemicals are due to their anti-oxidative, anti-inflammatory, anti-proliferative, and anti-angiogenic effects.

Todate, controlled studies with blinded evaluators are still needed to further assess their protective properties, pharmacokinetics, and bioavailability in the human body.

**Keywords:** Phytochemicals

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## THE EFFECTS OF OMEGA 3 INTAKE ON PHYSICAL ACTIVITY AND POST-TRAINING.

**João Cardoso, Rafael Henriques**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

**INTRODUCTION:** Nowadays, there is a great demand for physical activity attending to its benefits, such as weight and body fat loss. The search for supplementation is increasing considering its potential positive effects on physical activity. One of the supplements that is used is Omega 3, an essential fat with antioxidant properties that brings benefits to our health.

**OBJECTIVE:** To evaluate the influence of Omega 3 supplementation in different stages of physical activity and high performance sports and its positive or negative effects in our health.

**METHODS:** It was conducted an article review and the research was performed in PubMed and B-On databases, using as key-words: "Omega 3", "supplementation" and "sport". The research was firstly based on the Title, then we used the abstract to understand more about the article and to choose the articles to use. We have restricted our research for articles from 2008 until today.

**RESULTS:** When analyzed the influence of Omega 3 intake on physical activity and post-workout, it is possible to infer that Omega 3 intake has a positive relationship with physical performance, and studies have also shown that supplementation of Omega 3, provides positive aspects regarding the metabolism of lipoproteins, reduction of cholesterol, improvement of insulin action and efficacy in the post-workout, reducing its effects.

**CONCLUSIONS:** Omega 3 supplementation seems to have a positive effect on the performance and post-training in the athletes physical activity.

**Keywords:** Physical Activity, Supplementation, Omega 3

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## **THE INFLUENCE OF LINSEED AND BYPRODUCTS SEEDS IN THE TREATMENT OF DIABETES AND ITS COMORBIDITIES**

***Ana Rita Fialho, Carolina Gomes, Joana Abreu, Pamela Fonte***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

Introduction: Diabetes mellitus is a metabolic disorder that affects millions of people worldwide, characterized by hyperglycemia and serious health issues such as neuropathy, nephropathy, cardiovascular, immunity and hepatic problems.

Objective: The present review article pretends to demonstrate the antidiabetogenic effect of Flax Seed (*Linum usitatissimum*) and its sub products as an alternative or complementary option to a conventional pharmaceutical and dietetic approach.

Methods: This research used the following data base PubMed and ScienceDirect using “flaxseeds” and “diabetes” as key-words. From the mentioned sources we selected 27 articles and analyzed 21, from the year 2003 to 2018.

Results: As many authors verified there is a positive correlation between flax seeds and the management of diabetes and its comorbidities. The components of Flax seeds such as fiber, high fatty acids content and lignans, were shown to delay gastric emptying leading to a reduction of plasma glucose levels, mitigating the diabetic effects.

Studies shown that Flax seed oil and flour when administrated in diabetic pregnant women reduced the damage caused by maternal hyperglycemia, promoting normal blood pressure and elastic of the aorta in female offspring.

Conclusion: Therefore the biochemical profile of flax seeds seem to have a cost-effective potential to help decrease diabetes metabolic status and its complications, when added to management with conventional drugs treatment, as well as a preventive intervention, through its inclusion on regular food pattern.

**Keywords:** Diabetes, Flax Seeds, Glucose Levels

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## THE LOWERING EFFECTS OF FERMENTED SOYMILK IN THE HYPERTENSION

**Ana Ferreira, Carolina Silva, Margarida Tomé, Sara Resende**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

Background: Currently, soy products are large consumed around the world, mostly in Asia, what made them the most available source of vegetarian protein. The diagnosed cases of hypertension have increased around the world, reason why lowering effects solutions are search.

Objective: Toverify if soymilk has potential benefits in the prevention and treatment of hypertension.

Methods: Pubmed was used as database, where we found several scientific articles and books. The research was made by “soymilk and health” as keywords.

Results: The fermented soymilk reduces the hypertension due the fact that he increases the serum nitic oxide level witch is controlled and mediated through its polyphenols.

Conclusions: Fermented soymilk seems to have potential lowering effects in the hypertension.

**Keywords:** Hypertension, Soymilk, health.

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## ORGANIC PRODUCTS – THE IMPACT OF NITRATES AND NITRITES ON INFANTS' HEALTH

**Joanna Nunes, M. Francisca Teixeira, Tiago Freitas**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

**BACKGROUND:** Agriculture has two approaches: conventional and organic. Conventional crops are defined by the use of chemical fertilizers and pesticides, whereas organic crops are based on biological fertilizers. These fertilizers contain nitrates, substances that are naturally present in the soil, water, and plants. The concern with nitrates is their transformation into nitrites that occurs naturally in the human body, which may form nitrosamines, potentially carcinogenic, and cause methemoglobinemia, a disease that impairs the transport of oxygen from the alveoli to tissues, which can lead to death.

**OBJECTIVE:** The objective of this article is to understand the difference between organic and conventional agriculture and the effects of nitrates dietary intake on infants' health.

**METHODS:** This study was based on the review of many articles found on PubMed and ScienceDirect databases, which were chosen attending to their titles and abstracts. We were able to find them using the keywords – “organic products”, “nitrates”, “methemoglobinemia” and “infants”.

**RESULTS:** Methemoglobinemia is more prevalent in infants since their gastric pH is higher and their hemoglobin is easier oxidated in methemoglobin by nitrites. Thus, there will be a higher quantity of methemoglobin than hemoglobin and, consequently, a lower transport of oxygen.

**CONCLUSION:** Among the infants, methemoglobinemia is more incident in those that are fed by infant formulas, because, many times, they are prepared with well water that has high concentrations of nitrates and can be contaminated.

**Keywords:** “organic products”, “nitrates”, “methemoglobinemia”

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## THE EFFECTS OF BEEF AND WHEY PROTEIN ON BODY COMPOSITION

***Lea Da Cruz, João Lemos, Diogo Martinho***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

**Introduction:** Total protein intake and protein source have an important role during the growth and development of human body, particularly to explain changes in body composition. Whey has an essential amino acid (leucine) that is a source for optimizing muscle protein synthesis. Equally, beef is a protein containing all the essential amino acids. The effects of whey protein have been extensively studied, however far too little attention has been paid to beef protein.

**Aim:** The current research examined the effects beef protein comparing to whey protein on body composition.

**Methods:** Electronic searching was realized across four databases (PubMed, Web of Science, Science Direct and Scopus) and was performed by three authors. Key terms included on the search were “meat” OR “whey protein” OR “beef protein” OR “whey protein AND beef protein” OR “beef protein AND body composition”. Title, abstract and manuscripts published from 2003 until 2018 were analysed before the inclusion on the present paper.

**Results:** Whey and beef proteins tend to preserve or increase lean body mass and decreased fat mass. Differences among groups (whey vs beef) are ineligible.

**Conclusion:** The current research suggested that protein supplementation is important to improved body composition. However, protein supplementation, irrespective of source (whey or beef), improved body composition relative to participants do not consume protein.

**Keywords:** meat; fat mass; lean mass; peptide

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## PROBIOTICS COMSUMPTION TO A BETTER MENTAL HEALTH

**Alexandra Coelho, Catarina Nunes, Eduarda Melo, Sara Breu**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

**BACKGROUND:** Probiotics are a live micro-organisms which, when administered in adequate amounts, confer a health benefit on the host. In recent years, it has been recognized that the intestinal microbiota sends messages to the brain through a variety of routes. With this, the gut-brain axis has immersed itself as a therapeutic promise for mental illness.

**AIM:** To clarify the effects of probiotics in the treatment of psychiatric diseases.

**METHODS:** It was conducted a literature review using PubMed and ScienceDirect databases, with “probiotics”, “mental health”, “Lactobacillus”, “brain”, “gut-brain-axis”. The selection of articles was done initially by title, later by the abstract and finally by the integral analysis of the selected articles.

**RESULTS:** The scientific evidence presented in this article demonstrates that probiotics, especially of the genus *Lactobacillus*, are safe and have the ability to modulate the central nervous system, positively influencing the mood.

**CONCLUSIONS:** It has been found that dietary supplementation of probiotics seems exert a wide range of beneficial mental health effects in humans.

**Keywords:** “probiotics”, “mental health”, “Lactobacillus”, “brain”, “gut-brain-axis”

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## VITAMIN D SUPPLEMENTATION IN GERIATRICS

**Ana Guedes, Diana Guerra, Inês Ferreira, Mariana Rodrigues**

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

The aging of the population has increased, as well as the consumption of vitamin/trace mineral supplements, which is now a multibillion-dollar industry. Some individuals require supplementation because of problems with intake, absorption, or metabolism.

Vitamin D is a fat soluble vitamin, and it has actions on multiple organs and tissues, even though it's not considered a true vitamin because humans can synthesise it with sunlight exposure.

In elderly, vitamin D deficiency is a significant health problem, that can be prevented with supplementation.

Our aim is to understand the effects of vitamin D supplementation in the geriatric population.

A literature review was conducted through research databases "PubMed", "Google Scholar" and "National Institutes of Health" using the keywords "Vitamin D" and "Supplementation" AND "Geriatrics". We selected about seven articles between 2006 and 2018.

Seniors who have 65 to 75 years old, it is recommended supplementation of vitamin D in the dose of 800-2000 IU/day. For seniors with more than 75 years old, it is recommended the supplementation in the dose of 2000-4000 IU/day. Some studies suggest that Vitamin D supplementation should be independent of season.

It has been demonstrated, through different studies that high levels of vitamin D are associated with a reduced risk of several diseases. Furthermore, several studies have shown a potential effect of vitamin D on human health, but many clinical trials are lacking to provide substantial evidence of vitamin D benefit in addition to bone health. Vitamin D supplementation should always be adequate for each patient, according to their weight, demographic characteristics of the subject and outcome.

**Keywords:** Supplementation; Vitamin D; Geriatrics

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## PARENTERAL NUTRITION WITH CALCIUM AND PHOSPHORUS SOLUTIONS IN NEONATES

***Carolina Almeida, Rui Soares***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Parenteral nutrition is a feeding regimen where the person is artificially fed. It's a technique widely used in preterm infants who normally present an inadequate intake of calcium and phosphorus during their formation.

With this work, we intend to approach the extent to which parenteral nutrition with calcium and phosphorus solutions in neonates may be relevant and effective.

We searched at the PubMed and Google Scholar under the terms "Parenteral nutrition solutions", "Parenteral nutrition and calcium and phosphorus solutions" and "Parenteral nutrition AND neonates". The temporal space was from 2010 until today, and the articles of the last space have become the most relevant, with a view to obtaining the most current view of the theme. We found 10 articles from which we eliminated 5, which contained a less suggestive abstract, and which proved to be short of our vision for work.

We obtained five review articles, three of them having the most impact, relevant and studied for the work. These suggest that calcium and phosphorus are needed for bone metabolism and skeletal mineralization.

They all demonstrated concordance and demonstrated that the amount of calcium and phosphorus are effectively important for the normal growth and development of preterm infants and that their solubility could be influenced by multiple factors. Thus, and depending on these factors, the recommended doses of calcium and phosphorus are 1-3 mEq/kg/d and 0.5-3 mM/kg/d.

Our goal has been completed, as we have been able to realize what calcium and phosphorus solutions in premature babies are for.

**Keywords:** Parenteral nutrition, Calcium and phosphorus solutions, Neonates

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## **SUPPLEMENTS IN CARDIOVASCULAR DISEASES: OMEGA 3**

***Ana Rita Gonçalves, Diana Ferreira, Rita Santos***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

This study aims to research the effects of omega three supplements on cardiovascular diseases. Omega-3 is a compound that contains eicosapentaenoic acid and docosahexaenoic acid, which are the long-chain omega-3 fats, which are long-chain polyunsaturated omega-3 fats. The two bioactive molecules are essential nutrients with roles in a range of health areas including ageing, brain health and development, cardiovascular health, and eye health. These reduce cholesterol production, which delays the progress of atherosclerosis.

For this review, databases such as PubMed and Scholar Google were consulted. We collected 11 articles, during two weeks, 6 of which were later eliminated, obtaining information from 5 articles.

Studies performed in vitro (adhesion molecule expression by endothelial cells and endothelial-leukocyte adhesion) and in vivo reported a variety of changes in cell surface expression, protein levels and mRNA expression, depending on the combination of the treatment with eicosapentaenoic acid or/and docosahexaenoic acid.

On the other side, studies have been done in which the intake of omega three did not change any result or increased some markers present in the blood.

Dietary supplements are not medicines, do not need a prescription, so don't require a demonstration of efficacy and safety. Thus, these supplements are not "pure" and may contain other undesirable components. The recommended daily dose of omega 3 is about 1.5g.

Of the observed articles, about five demonstrated that the active molecules had therapeutic action and 4 counteracted this assumption.

**Keywords:** Food supplements; Omega 3; cardiovascular diseases

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## **IMMUNOSUPPRESSIVE DRUGS IN LIVER TRANSPLANTATION AND NUTRITIONAL CHANGES**

***Beatriz Almeida, Tatiana Vieira***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Liver transplantation is intended for patients with acute liver failure, decompensated cirrhosis, hepatocarcinoma, C virus hepatitis, alcoholic liver disease, among others.

In post-liver transplantation, most patients receive oral nutrition simultaneously with immunosuppressive drugs. Immunosuppressants are inhibitors of the enzyme inosinamonomophosphate dehydrogenase, responsible for the synthesis of proteins that are part of the lymphocyte DNA, one of the main cells involved in the organ rejection process. The most used are prednisone, tacrolimus / FK and mycophenolatemofetil / MMF.

Therefore, there is a possibility of drug-nutrient interaction, which may lead to a change in the patient's nutritional status or to the availability, action and toxicity of the drug, and are the risks of these interactions that are intended to evaluate in this work.

A search was fulfilled with the keywords nutrients, drug interaction and liver transplantation, in pubmed, scholargoogle and updoc, from 2006 to 2018, resulting in the selection of four articles.

In one study with 27 patients submitted to liver transplantation, 70% were diagnosed with moderate malnutrition, 13% with mild malnutrition, 10% with obesity, and 7% with eutrophy. After the introduction of nutritional and immunosuppressive therapy, digestive disorders were observed: diarrhea (58%), vomiting (49%), abdominal distension (45%), nausea (53%), constipation (27%) and colic ; and biochemical alterations: hyperglycemia (53%), high levels of urea (59%), creatinine (15%), TGP (33%), TGO (37%) and alkaline phosphatase (30%) and low levels of sodium (10%) and potassium (52%).

Thus, the existence of drug-nutrient interaction in the immediate post-liver transplantation is proven, and a future research is needed in order to reduce the risks of these interactions.

**Keywords:** Drug-nutrient interactions; liver transplantation; immunosuppressive drugs

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## **BENEFITS OF CREATINE USE ON THE ELDERLY POPULATION**

***Daniel Figueiredo, Luís Ferreira, Luís Reis, Pedro Silva***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Creatine is a substance of the amine group, composed of three amino acids: arginine, glycine and methionine. It acts directly on the satellite cells, which are cells located around the muscle and that promote the greater or lesser number of nuclei in the muscle fibers. During the course of this research, we based on 6 similar scientific articles with the aim of ascertaining if the use of creatine causes beneficial effects on health and lifestyle in the elderly population, which has relative loss of muscle mass and strength and decrease in the ability to perform daily activities.

Within each of the studied populations aged 55 to 70 years, there was a division into three groups: creatine intake before, after and the control group.

The levels of body composition (lean mass, fat mass) and muscle strength to detect possible changes in these values were measured before and after the study. It was evidenced that post-training supplementation with creatine displayed better results in terms of muscle strength, fat mass index, lean mass increase, relative skeletal muscle index, sports performance and also a lack of adverse effects. Regarding the pre-training, it also shows positive results when compared to the control group. We conclude that in the future there should be a research focus on the mechanisms of action of creatine in aging muscles to be more precise and rigorous about the time and dose of creatine recommended for an improvement in the quality of life without great possibility of existence adverse effects.

**Keywords:** Creatine; muscle mass; exercise; elderly

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## CONJUGATED LINOLEIC ACID (CLA)

***Cristiana Coutinho, Kelly Correia, Mariana Esteves***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Conjugated linoleic acid (CLA) has garnered special attention as a food bioactive compound that prevents and attenuates obesity.(1)

Conjugated linoleic acid is used in many diet supplements and has been extensively studied in the last ten years because it helps to reduce body fat and promote beneficial health effects in humans, such as anti-carcinogenesis reduction and modulation of the immune system. (2)

Linoleic acid can be found in corn, sunflower, soybean oils and higher concentrations in ruminant fat, such as beef, dairy, among others. (3)

In our work, we intend to address benefits, but also disadvantages of using this supplement. Our research was based on articles collected in Pub Med. We collected 9 articles, however, only 4 were used.

Conjugated linoleic acid has been considered a potent anti-obesity agent, due to its possible modulating properties in lipid metabolism.

The ability to reduce body fat while increasing lean body mass is explained by the indirect reduction of fatty acid uptake by adipocytes, by the reduction of lipoprotein lipase activity, as well as by the enzyme destroyed esteroyl CoA. (2)

Despite the positive effects of conjugated linoleic acid supplementation on some health-related parameters, there are some reports of possible adverse effects such as increased levels of triglycerides and LDL-cholesterol and reduction of HDL levels. Obese subjects also had negative changes in glucose metabolism with insulin resistance in some studies.

In this sense, the consumption of foods naturally enriched with conjugated linoleic acid (not supplementation) during life would be an alternative to reduce the increase of adiposity. (4)

**Keywords:** conjugated; linoleic; acid; supplements;

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## HOW IS CHARACTERIZED THE NUTRITIONAL SUPPORT IN CHILDRENS WITH ACUTE PANCREATITIS?

***Beatriz Loureiro, Iva Soares, Natacha Roseiro, Ruben Costa***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

There's no specific treatment for the acute pancreatitis, so it is based on nutrition, hydration and analgesics for pain control. Nutrition is an essential component because of its ability to respond to inflammation, maintain the intestinal barrier and decrease bacterial translocation.

Being the nutrition therapy so important, the aim of this work was to describe how it works on children with this disease.

This project is based on a review of the literature, elaborated from seven scientific articles, two books specialized in Nutrition and a medical encyclopedia. For the research of the articles we used as databases Pubmed and Scholar Google. The dates of the selected publications range from 2005 to 2017. During the information search process we used the following keywords: "acute pancreatitis", "children", "nutritional support", "parenteral nutrition" and "enteral nutrition".

In the treatment of pancreatitis in children, the nutritional approaches are the Parenteric Nutritional Therapy (PNT) and Enteric Nutritional Therapy (ENT). PNT was the first nutritional approach, since it minimizes pancreatic stimulation and local inflammation, avoiding the development of the disease. However, several authors argue that it increases the rate of hospital infections, so now it is used only when patients do not reach nutritional needs through ENT. This second therapy demonstrated better results in the maintenance of the normal intestinal flora and the gastrointestinal mucosa and it also controls septic complications.

Although these nutritional supports are both widely used, oral feeding should always be preferred, but when this is not possible then the ENT should be chosen.

**Keywords:** acute panceatitis; children; nutrition; parenteral; enteral

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## **WHAT IS THE EFFECT OF BRANCHED-CHAIN AMINO ACID SUPPLEMENTS ON MUSCLE RECOVERY IN HYPERTROPHIC ATHLETES?**

***A. Cardoso, Maria Marmé, Marta Prata, Joana Rodrigues***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

The branched chain amino acid sports supplement is composed by valine, leucine and isoleucine, these 3 amino acids are part of muscle proteins and are essential in muscle development.

A hypertrophy workout evidently induces muscle wasting and, in post-workout, branched-chain amino acid levels are low and that is when athletes resort to this supplement for better and faster recovery.

The objective of this study is to demonstrate the effects of this supplement on the muscular recovery of these athletes. As for the scientific review the following keywords were used: amino acid sports supplement, resistance training and hypertrophy, in PubMed and Google Scholar. A total of 11 articles were analyzed for this work, from 2008 to 2018. Through these studies, experiments were performed with groups of athletes practicing hypertrophy in which all of them were supplemented with placebo or branched chain amino acids. Several parameters were analyzed: maximum voluntary contraction, plasma creatine kinase, for example. Plasma creatine kinase levels are the most significant indicator of muscle wasting, the higher the level of this enzyme in plasma, the greater the muscle wasting.

In one article, participants ingested 10 g of branched chain amino acid supplementation, twice per day (morning and evening), and in the other 5 g before exercise, it was concluded that this supplementation, when administered before and during hypertrophy training, reduces muscle fatigue and accelerates muscle recovery (compared to placebo), as there is a significant decrease creatine kinase levels.

Thus, these supplements prove to be an interesting nutritional intervention in the recovery of at.

**Keywords:** Amino acid sports supplement, Recovery, Muscle fatigue

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## MAGNESIUM SUPPLEMENTATION AND ATHLETE

***Mário Vintém***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Magnesium (Mg) is an essential mineral that plays a critical role in the human body because it is involved in more than 300 metabolic in the body. The part of the process of energy metabolism and help in maintaining normal muscle function. The articles at this study are the most important major and magnify in the physical activity, in which is a major physical study.

Physical exercise practitioners in general, and experienced athletes in relation to performance, are responsible for helping the nutritional balance to acquire the best physical vitamins and sports performance.

By magnesium role in energy production and storage, normal muscle function and maintenance of blood glucose levels, it has been studied as an ergogenic aid for athletes.

**Keywords:** Magnesium, metabolism, athletes, supplementention

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## IODINE SUPPLEMENTATION IN PREGNANCY

***Adriana Sousa, Mariana Catarina, Vânia Soares***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Pregnancy is a state of extreme metabolic and nutritional requirement, there is a growing need of macronutrients. During pregnancy, iodine requirements are raised by the increased need for thyroxine to maintain maternal metabolism by transferring iodine and thyroxine to the fetus and by increasing the renal clearance of the pregnant. Thus, we intend to study the importance of iodine supplementation during pregnancy. For this work, a search was made in a scientific search engine. Were researched twelve review articles published between 2013 - 2018, however, only three were selected to evaluate if iodine supplementation is beneficial in pregnant. To do this, the keywords were used: iodine supplementation and pregnancy.

Iodine together with other micronutrients plays an important role in the developing fetus, since it plays a determinant role in the growth and development of the organs, especially in the maturation of the Central Nervous System and subsequent neurodevelopment.

If the iodine ingestion is adequate, the existing reserve is enough. However, if there is a severe deficiency of iodine during pregnancy, maternal and fetal hypothyroidism occurs due to the inadequate production of thyroid hormones with severe repercussions on development and growth, causing childhood cretinism.

Iodine deficiency is considered a worldwide problem, so World Health Organization recommends universal availability of iodine in shape of iodized salt to range the whole population.

All articles are in agree. From the results obtained, it is possible to conclude that, in the three studies, iodine supplementation is recommended in pregnant with deficiency of the same.

**Keywords:** iodine; supplementation; pregnancy

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## **FOOD AND DRUG ABSORPTION: THE INFLUENCE OF SOLUBLE FIBERS ON PARACETAMOL ABSORPTION**

***Andreia Louro, Ercília Mondlane, Inês Alves, Inês Figueiredo***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Fibers are resistant to the action of human digestive enzymes. Soluble fibers are mainly found in fruits, vegetables, pulses, oat, barley and rye. They cause effects in the digestion time in stomach and small intestine.

Paracetamol is an analgesic and antipyretic drug used in the symptoms of flu and cold syndroms and mild to moderate pain.

Gastrointestinal absorption is influenced by gastric emptying time. Most drugs are absorbed in the small intestine, such as paracetamol, so absorption will depend of gastric emptying rate.

Therefore, our objective will be to understand the influence of soluble fibers on paracetamol absorption.

We analysed 8 scientific articles from 1973 to 2018, using Pubmed and Google Scholar and 2 books. We used key-words such as Paracetamol, Soluble Fibers, Gastric emptying, Food-drug interaction and Gastrointestinal absorption.

Paracetamol is a weak acid and it's absorbed in the small intestine. Therefore, a limiting step in absorption corresponds to the gastric emptying process of paracetamol to the duodenum.

Gastric emptying can be influenced by the ingestion of soluble fibers such as carrot and lettuce, which causes a delay in the gastric emptying, resulting in a delay in the absorption of drugs. Fibers delay gastric emptying as they absorb water and swell.

Paracetamol is one of the most dangerous compounds and there's no reference to the dose of fibers that will interact with paracetamol, so it's advisable that when taking this drug, there is no consumption of fibers.

**Keywords:** Paracetamol, drug absorption, fibers.

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## THE GINKGO BILOBA CONTROVERSIES

***Adriana Gomes, Beatriz Rodrigues, Beatriz Pedro, Tatiana Almeida***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Ginkgo bilobais a chinese's tree, which is commonly used as Ginkgo Biloba leaf extract.

The objective is to decode the reasons for consuming this supplement through the analysis of some articles and certain populations under study, not only what effects are observed, namely cognitive level, but also the toxicological effects of experimental studies in human cases and the action of the dry extract for memory disorders.

Our research was realized through the following search engines "Google Scholar", "Pubmed" and "Scielo". So it was through them that we elaborated our work, since we have found a purpose for its realization in three review articles (article of the "Pubmed" of 2017 and the book of 2018, article of "Scielo" of 2010 and, finally, article of "Google Scholar" of 2002).

Our analysis of use through the "Google Trends" took into account a period of five years. In terms of duration, our research was made between october 3, 2018 and october 25, 2018. Key concepts include Ginkgo Biloba, student society, cognitive function and supplement.

However, there is an insufficient evidence to indicate the use of this supplement for the purpose of treating and/or preventing memory disorders. In spite of this, the extract has a fundamental role in the brain, especially in circulatory terms, acting as an antioxidant and improving the absorption of glucose.

In conclusion, the various objectives were fulfilled. We were able to know the reasons that lead to the ingestion of Ginkgo Biloba, the main cognitive effects and adverse effects.

**Keywords:** Ginkgo Biloba, Student Society, Cognitive Function and Supplement

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## FOOD SUPPLEMENT FOR PHYSICAL AND MENTAL FATIGUE

***Catarina Oliveira, David Muge, Ricardo Santos***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

This type of food supplement is used in adults in a situation of nutrient deficiency. It is marketed under two distinct forms of presentation. Helps maintain brain function and performance, particularly in people in situations of stress or greater intellectual effort. Contains omega-3 fatty acids, Ginkgo biloba extract, phosphatidylserine, folic acid and vitamin E and B12, contributing to ensure a sufficient supply of these nutrients and respond to the changing needs of the body.

The purpose of this study is to demonstrate the effects of this type of supplementation on physical and mental fatigue.

As for the scientific review, the following keywords were used: food supplement, physical and mental fatigue, in PubMed and Google Scholar. Six articles were analyzed for this work, from 2003 to 2017.

It does not interfere with the pill, nor does it make you fat. If you take vitaminic complexes you must see if in the composition you do not have the same components so that over-dosing does not occur, for example Vitamin E.

At the start of taking this product, the consumer should seek medical or pharmaceutical advice if they take medication, suffer from epilepsy, clotting disorders or diabetes, in case of pregnancy or breastfeeding or if they will undergo surgery.

This food supplement should not be taken as a substitute for a balanced and varied diet and a healthy lifestyle. A daily intake of one to two capsules per day is recommended with food or non-alcoholic beverages.

**Keywords:** Food supplement, physical, mental fatigue

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## PREVENTION AND CONTROL OF INFECTIONS AND ANTIMICROBIAL RESISTANCE

***Bárbara Cardoso, Carolina Matias, Deise Santos, Miguel Maia, Sara Umbelino***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

**BACKGROUND:** Currently, the appearing of infections, especially at the hospitals, is almost inevitable, and antimicrobial resistance is one of the main growing public health problems of this century. These infections hamper the treatment of patients, which makes them stay longer in the hospital, thus spending more resources. The control of these infections is related to the preventions of the appearing of antimicrobial resistance, because they treat patients, but at the same time they promote the appearance of more resistant bacteria.

**AIM:** The objective of this review is to gather information about infections and antimicrobial resistance in hospital settings.

**MATERIAL & METHODS:** This review is based in five articles found through the following search engines: "PubMed", "Google" and "Google Scholar" between the time range of 2004 and 2018.

**RESULTS:** We observed a high prevalence of hospital infections and consumption of antibiotics, for example in 2011-2012, (45.3%) of hospitalized patients worldwide were treated with antibiotics, however the percentage in the European union was 35.8%. These results only prove that a high consumption of antibiotics leads to the increase of microbial resistance, in this sense it is important to prevent, promoting the rational use of medicines.

**CONCLUSION:** To prevent and control microbial resistance, it's necessary to promote, inform and educate the society. Therefore, it is crucial to alert to the proper use of antibiotics and to the existence of prevention measures to combat this resistance. Another conclusion arising of this review is that pharmaceutical professionals plays an extremely important role in the education of other health who interact with the drugs and with the consumers, alerting them to its rational use.

**Keywords:** Antimicrobials, hospital infection, resistant bacteria, control and prevention of the infections

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## FALSIFYING MEDICINES AND COUNTERFEITING

***Mariana Marques, Teresa Pinheiro, Carolina Valeiro, Pedro Ribeiro***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Background: According to the World Health Organization (WHO), "a counterfeit medicine is the one that deliberately or fraudulently misrepresent their identity, composition or source". Counterfeiting can apply to both branded and generic products.

This bibliographic review aims to analyse/assess the risks associated to falsified medicines.

Material & methods: For this review four articles and thesis, as well as current and future legislations about falsified medicines and its counterfeiting were used. In addition, we also resorted to information by INFARMED, given its important role in the combat of this crime.

Results: Falsified medicines can be classified as:

- Correct active principle;
- Wrong active principle;
- Absence of active principle;
- Incorrect dosage of active ingredients;
- Incorrect excipients;
- Counterfeit Packaging.

It is estimated that approximately 1% of the total number of medicines on the market in developed countries may be counterfeit. However, this value can reach between 10-30% in African, Asian or Latin American countries.

The greatest impact of counterfeiting has been verified in the therapeutic areas such as erectile dysfunction, weight loss, oncology, cardiology and neurology.

In response to the growing public health crisis of counterfeit medicines, the WHO created an International Medical Products AntiCounterfeiting Taskforce- IMPACT, which aims to build coordinated networks between countries in order to combat the production, commercialization and sale of fake medicines worldwide.

Conclusion: The establishment of an appropriate national regulatory system for medicines should be considered and it's the Government's responsibility to ensure that counterfeit medicines are removed from the market and their sources are discovered and eradicated.

**Keywords:** Key words: Falsified medicines, counterfeiting.

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## THERAPEUTIC RECONCILIATION

**Ana Rita Silva, Carla Pinto, Inês Bravo, Joana Carvalho, Mariana Leal, Sara Coelho**

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Accordingly to Direção Geral de Saúde (DGS), therapeutic reconciliation is a process designed to avoid medication errors during the transition of patient care. This process should include the comparison between the current medication and the previous therapeutic regimen and should occur at each point in the transition between health care where the medication is adjusted, also taking into account self-medication.

The objective of this work is to highlight the importance of therapeutic reconciliation in polymedicated population, as elderly, which frequently are transferred of healthcare facilities.

This review was based on Quality Health Department' norm 018/2016 of 30/12/2016, issued by the Portuguese DGS, the article from the "Boletim do Centro de Informação do Medicamento - Reconciliação da medicação: um conceito aplicado ao hospital" and another from Google's Scholar "Reconciliação de terapêutica", by Afonso, R., Search was performed in Google Scholar during in October 2018, looking for publications between 2013 and 2017.

Therapeutic reconciliation process has a shared responsibility among healthcare professionals as nurses, hospital / community pharmacists, practitioners and others in collaboration with patients and family members.

Several advantages were listed, as reducing medication errors and the risk of adverse events, improvement of communication between healthcare professionals and patients, improvement of the information collection and treatment process, increased adherence to therapy, prevention of complications in chronic patients and consequent improvement of the quality of life.

Currently, there are already several hospitals with of therapeutic reconciliation implemented, some still in studies, but all of them still come across several factors to improve.

**Keywords:** Patient safety; Medication safety; Therapeutic reconciliation

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## MEDICATION ERRORS

***Adriana Dourado, Carolina Castanheira, Mariana Cardoso, Rita Gonçalves, Margarida Dias, Maria João Ferreira***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

**BACKGROUND:** Medication errors are common occurrences that can take on big clinical dimensions and that usually result from poor professional practice or communication issues. Preparation, prescription, dispensation, administration and other factors like the education of the patient, monitorization and rational use of medications can affect the risk of error

**AIM:** The objective of this review is to describe the main reasons for occurrence of medication errors.

**MATERIAL & METHODS:** This review was based on five articles and one thesis found on the “b-on” and “Google Scholar” databases, comprised between the years 2010 and 2013.

**RESULTS:** Wrong selection of the prescribed medication leads to the occurrence of preparation errors. When the drug is prescribed, its choice, dose, concentration, regimen of administration, dosage form and route of administration should be taken care of with utmost care, taking in consideration the needs of the patient and their clinical condition. The dispensing error occurs in the supply of medicines to the patients. The most common errors are related with dispensing a different drug than the prescribed, wrong concentration or a wrong pharmaceutical form. The administration error is related to dose failure, route of administration and technique used. According to Abreu et al., therapies of different groups were usually found side by side in the storage area with identical bottles and colours which are a motive of concern regarding medication errors.

**CONCLUSION:** To reduce the occurrence of medication errors in the future, it's necessary to improve communication between stakeholders of drug circuit, including healthcare professionals (as practitioners, pharmacy professionals, nurses) and patients.

**Keywords:** Administration errors, Dispensing errors, Medication errors, Preparation errors, Prescription errors.

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## ARE THE “SELF-MEDICATION” ON PAEDIATRICS A MOTIVE FOR CONCERNING

***Cristiana Barros, Mariana Lima***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

Self-medication is characterized by the ingestion of drug substances without proper prescription or medical counselling by a qualified healthcare professional (HPC).

The ingestion of excessive doses of drugs can cause undesired effects, so there are need to increase the information provided to the population.

The user can buy medication by prescription, pharmaceutical indication or self-medication. The latter doesn't only cover non-prescription medicines, but also herbals and nutritional supplements. On the other hand, the inadequate use of medicines under prescription without medical counselling is also a reality.

The purpose of this review is to find out which drugs are most used in self-medication on paediatrics.

For this review, were consulted 3 articles published between 2010 and 2017 in the "Google Scholar", "SciELO" and "B-on" databases. Additionally, data from INFARMED were also used.

Much of the process of self-medication comes from the children's own parents.

According to the articles investigated, it was verified that more than 60% of the population under study already practiced self-medication, being the main reasons that motivated to think that they are simple health problems possible to be solved by the reutilization of old prescriptions or the caregivers themselves.

Paracetamol (84.7%), ibuprofen (53.1%), anti-histaminics (17.7%) and laxatives (15.3%) were the most commonly used drugs for paediatric use. Significant use of some medicines with specific and limited indications for paediatric age, mainly antitussives, antidiarrheals and antiemetics, was also observed.

Responsible self-medication brings benefits, and this is the goal to achieve. Despite the information available, parents continue to opt for this practice.

It's therefore necessary to warn and emphasize the unexpected and harmful effects of this practice in children's through HCP counselling and discourage parents of using unrelated medicines in their children without medical prescription.

**Keywords:** Self-medication, paediatric age, irrational use, public health, medication errors

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## ORPHAN DRUGS FOR GAUCHER DISEASE

***Adriana Matos, Dina Marques, Jéssica Melo, Eduarda Coelho***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School, Farmácia, Portugal*

**BACKGROUND:** Orphan drugs are used to treat rare, severe and potentially fatal diseases. According to European Union (EU), a rare disease affects less than 5 in 10.000 people and there are about 5.000 to 8.000 rare diseases. Gaucher's disease is an autosomal recessive disease featured by the deficiency of a lysosomal enzyme glucocerebrosidase, that leads to substrat accumulation of glucosylceramide in liver's reticuloendothelial cells, spleen and bone marrow. This disease presents 3 types according to the presence or not of nerve damage and its progression. The treatments include ERT - Enzyme Replacement Therapy and SRT - Substrate Reduction Therapy.

**AIM:** The aim of this bibliographic review was to describe the use of orphan drugs on Gauscher's disease and clarify the prevalence and incidence in Portugal and UE.

**MATERIAL & METHODS:** For this review we used articles published in the database EMA (European Medicines Agency), Pubmed, SciELO and Google Scholar with information of the last 5 years. Eight articles were selected and after analysis 5 were used in the review.

**RESULTS:** According to EMA and Committee for Orphan Medicinal Products (COMP) Gaucher's disease affects 5 in 100.000 people in EU, which are about 26.000 people. The prevalence of this disease in Portugal is 1 in 100.000 people, which means that there are about 100 diagnosed cases of Gaucher.

Orphan drugs that were approved by EU for ERT therapy are VPRIV® (velaglucerase alfa) and Cerezyme® (imiglucerase), while for SRT therapy is used Zavesca® (miglustat) and Cerdelga® (eliglustat).

**CONCLUSION:** In Europe, Gaucher disease has been increasing and only 4 drugs are allowed to be marketed at this time. These patients have the right to have access to a broader range of drugs as well as to non-rare diseases, but there should be support and incentives for the Pharmaceutical Industries to invest in the research and development of new molecules to treat rare diseases.

**Keywords:** Orphan Drugs; Rare disease; Gaucher Prevalence and Incidence; Lysosomal Storage Disorder

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## **PACKED LUNCH FOOD SECURITY**

***Inês Caseiro, Inês Ferreira, Rúben Ferreira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Every day, around the world, people get sick because of something that they ate. These diseases are designated for food-borne diseases. The food-borne diseases majority can be avoided with good practices of food manipulation.

This study's goal was to investigate the level of knowledge and good practices about packed lunch's food security and raise population awareness of how to use packed lunch following the food security rules. To achieve this goal, we made a bibliographic revision of this concern and applied an inquiry to the population, made by the investigation team.

It was found that 81.5% of the population has a good notion about food-borne diseases definition. It was also found that 77.2% use plastic to transport their packed lunch, 82.6% knows that glass is the best material for packed lunch transportation, 76.1% check the microwave cleanliness before using it and 41.3% knows that the warm meals safe temperature is higher than 65°C and the cold meals safe temperature is lower than 5°C.

We may conclude that the population majority use plastic to transport their packed lunch, which is not a good practice because it releases health-harmful chemicals. Such the use of packed lunch is more frequent, it is necessary that the population knows good practices about food security transportation and don't pass through the danger zone (5°C until 65°C), in order to avoid food-borne diseases.

**Keywords:** Packed Lunch, Food Security, Health, Temperature.

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## FOOD SAFETY IN PRIMARY SCHOOLS AND KINDERGARTENS

***Diana Fernandes, Gonalo Oliveira, Sara Rodrigues***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

The school is critical in the formation of eating habits, since it is the place where most children and adolescents remain daily. All educational establishments should take into account the provision / marketing of nutritionally adequate foods and meals, and student preferences.

The risks of contamination in schools are greater due to the preparation of food well in advance, which favors the propagation of microorganisms. In addition, improper hygiene conditions can also compromise food.

The objective of this study is to evaluate the temperature at which meals are kept before they are distributed by the children, in order to verify if they are at the appropriate temperature to avoid the proliferation of microorganisms. A bibliographic review was done on the subject, and several measurements of the temperature of the meals were carried out in schools in the central zone, namely in kindergartens and primary schools.

According to the results obtained, we can compare the temperatures of the soup and the main course in primary schools and kindergartens. It was found that the difference in temperature of the main dish and soup differed, with foods below the appropriate temperature about 53% in the main dish and 5% in the soup.

In short, the deficiencies are not always related to the lack of financial resources, an important part of these deficiencies is linked to the lack of information from those responsible for the organization and operationalization of activities.

**Keywords:** Food safety, Quality, Temperature

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## THE IMPORTANCE OF BREAKFAST STUDENTS IN HIGHER EDUCATION

***António Gomes, Leonardo Pereira, Miguel Pinto, Rúben Cruz***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

The concept of food security is, according to the FAO, recognized as "a situation that exists when all people, at all times, have physical, social and economic access to sufficient food, safe and nutritionally adequate, enabling meet their nutritional needs and food preferences for an active and healthy life ". Breakfast is the first meal that breaks the fast after the sleep period, which means that this is the most important meal of the day. As was the methodology literature review and conducting a survey to a sample of students on your buffet-lunch. Having said that, we proceeded to the accomplishment of a job that he underwent an investigation to students with the aim to find out the same habits in relation to breakfast and what measures to take to resolve several errors that they sometimes make and talking about quality and food safety. Were respondents 66 students where 77.3% of respondents take breakfast everyday, 84.8% demonstrates your knowledge regarding the importance of breakfast, 71.2% knows the importance of a healthy breakfast, 93.9% of respondents replied that He eats breakfast at home and the rest claimed to be more economical and practical, on the question of whether to include a piece of fruit in your breakfast 71.2% answered no and 71.2% of respondents replied that consumes bread for breakfast. It is concluded that the breakfast will bring benefits, improves nutritional status, improves cognitive function and has a potential relationship with the body weight. Most people surveyed take breakfast, know your importance and its advantages, which makes this theme is a theme of General knowledge and with a lot of information available to literary and digital level.

**Keywords:** Breakfast; Students; Health

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## ASSESSMENT OF FOOD SAFETY IN THE DONATION OF FOODSTUFFS

**Ana Mafalda Gonçalves, Carolina Teixeira, José Batista**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

The importance of food in consumer's health and the dangers they pose to consumers when they are not properly handled along the agricultural food chain are now perfectly recognized by all. The transport and the distribution of food (including commercialization) is often one of the weakest parts in ensuring food safety. This work targeted is to verify the safety in the handling and distribution of food donated by two companies. For the accomplishment of this work the structural and functional hygienic conditions in the donation of products as well as a bibliographical review were evaluated. According to our results we can say that the transport and storage of products differ according to the type of products donated by both social solidarity institutions. Although there are areas which needs improvement, we found that both institutions had hygienic conditions in the transport of food, since the products arrived sealed, duly identified and with the legislated time, however the food was not kept at a appropriate temperature. With regard to the institution carrying out the storage, we find that it follows a strict routine so that all products are stored, prepared and consumed in order to reduce any type of contamination. It is concluded that the transport of products has a high importance in food safety, because a temperature variation or an isolation failure can lead to microbial development endangering the health of consumers. The adequate and hygienic storage of food is likewise important for the prevention of the spread of pathogenic microorganisms.

**Keywords:** Donation; Food Safety; Public Health

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## FOOD WASTE

***Adriana Felizardo, Mariana Pagaimo, Verónica Teixeira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Food waste represents an environmental and ethical problem and is correlated with hunger, poverty reduction, nutrition and economic and social growth. This occurs throughout the entire food chain, from production, processing, distribution to consumption.

The main objective of this task was to evaluate the food waste in canteens of a higher education institute aiming to alert and raise awareness among school community. It was based on a bibliographic review of scientific articles on the subject and a quantitative evaluation of food waste. 54 components of the dish were analyzed, in which the protein components and their accompaniments were divided. During a week, we performed the weighing of the edible part of the production, the leftovers and remains, where a total of 73496.16 Kg, 4531.61 Kg and 6794.7 Kg were obtained, respectively.

According to the analysis of food waste, it has been found that due to the lack of planning of menus and the lack of knowledge of nutritional needs, there is an excessive production. In order to solve this problem, several corrective measures should be implemented both at an environmental level and at the level of service management.

Millions of people die annually in the world simply because they are unable to feed themselves. In conclusion, there is a need for actions to raise awareness and implement programs to prevent food waste.

**Keywords:** Food Waste, Weightings, Service Management, School Community

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## **GOOD PRACTICES OF FOOD SAFETY IN CHEESE PRODUCTION**

***Andreia Filipa, Beatriz Grilo, Mónica Almeida, Mariana Martins***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Saúde Ambiental, Coimbra, Portugal*

Food safety is achieved when safe, sufficient and nutritious food is available to everyone at all times both physically and economically speaking. It is vital to make an active life a healthy life. The hygienic quality of cheese production is influenced by several factors: conditions of milk production, milking hygiene, milk conservation and product manufacturing.

The objective of this paper was to evaluate the level of knowledge and good practices on food safety in a dairy establishment. A bibliographical review on the subject and a questionnaire to the employees of a Dairy factory were the methodology used.

Concerning the evaluation of the knowledge of the correct washing of hands it was verified that all the workers have knowledge of how to wash their hands correctly although, it is visible that only 50% of the workers knew to mention the correct sequence of the washing of the hands done through images. However, it was found that 94% of the workers responded that they always wore appropriate footwear and washed and disinfected their hands several times a day.

We conclude that workers sanitize their hands regularly and claim to have knowledge about the hygiene process, however, when confronted about the proper handwashing, most of them demonstrate lack of information and training.

**Keywords:** Food Security; Good Hygiene Practices; Cheese

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## **SCREENING: IN THE BLOOD – YELLOW FEVER VIRUSES**

***Cátia Lopes, Maria Henriques, Mariana Campos, Tânia Cruz***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Ciências Biomédicas Laboratoriais, Coimbra, Portugal*

Yellow fever virus is a single-stranded RNA virus belonging to the genus *Flavivirus* of the family *Flaviviridae* and causes yellow fever disease and seven genotypes have been described. In 1927, scientists isolated the yellow fever virus in West Africa. The virus is endemic in tropical areas of Africa and Central and South America. Transmission of this virus occurs through vectors, infected mosquito, mainly through species of *Aedes* and *Haemagogus* mosquitoes. Once acquired, the virus spreads rapidly to various organs of the body. The incubation period of this virus is 3 to 6 days. The symptoms range from asymptomatic or mild characteristics to a haemorrhagic syndrome that can potentially lead to a fatal outcome with organ failure, the liver is the most important organ affected. To date, no specific therapy is available for, but a vaccine has been used for many years for the prevention and control of epidemics. The preliminary diagnosis is based on the patient's clinical characteristics, places and dates of travel and activities. Laboratory tests may include: serological tests to detect virus-specific immunoglobulin IgM and IgG antibodies. Treatment is directed toward symptomatic relief, in severe cases requiring aggressive supportive care and hydration.

**Keywords:** Yellow fever virus, flavivirus, RNA, vector, antibodies.

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## **COXIELLA BURNETTI - THE AGENT OF Q-FEVER**

***Cláudia Gonçalves, Daniel Coelho, Guilherme Puga, Morgana Moreira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Ciências Biomédicas Laboratoriais, Coimbra, Portugal*

The Q-fever is a gram-negative, pleomorphic coccobacillus caused disease.

Described for the first time in 1935 by H. Derrick as “query fever” relating to the unknown source of the fever to date. Cox and Davis isolated the pathogen in 1938 and described its transmission. The agent was officially named *Coxiella burnetti*, in 1948.

This bacterium is a ubiquitous zoonosis through urine, faeces, and ingestion of contaminated milk. Spore-like forms with affinity to alveolar cells can be released airborne and breathed in, which will result in a posterior infection of the macrophages and monocytes through the blood strain.

The acute phase translates into the flu-like syndrome, pneumonia and hepatitis and can be laboratory monitored through immunoglobulin (Ig) M, IgG and IgA antibodies (Ab). Its progression can lead to a chronic state with endocarditis and negative blood microbiology cultures.

Geographically vast distribution through western Europe whereas that Spain is endemic.

Direct diagnosis using microbiology cultures and Polymerase Chain Reaction. For serological diagnosis, different methods are available, like indirect immunofluorescence (IIF) and Enzyme-Linked Immunosorbent Assay (ELISA) methods. This diagnosis should be confirmed by serum titres (IgG and/or IgM).

Treatment is possible using Doxycycline for 2 weeks (acute illness) and doxycycline in combination with hydroxychloroquine for 18 months to several years (preferred for chronic infection).

Important for immunohemotherapy considering that this agent can be transmitted by blood transfusions, via perinatal and through bone marrow transfusion.

**Keywords:** *Coxiella burnetii*; Q-fever; antibodies; zoonoses

## JAPANESE ENCEPHALITIS

***Lucie Cordeiro, Mara Guedes, Maria Soares, Teresa André***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Ciências Biomédicas Laboratoriais, Coimbra, Portugal*

The Japanese encephalitis virus (JEV) is a Flavivirus, from the family Flaviviridae it's the leading cause of vaccine-preventable encephalitis in Asia and the western Pacific, being endemic to large parts of this areas. An estimated 3 billion people are at risk, and Japanese encephalitis (JE) has recently spread to new territories.

The JEV is maintained in a cycle involving mosquitoes, which are the main source of human infection, and vertebrate hosts, mainly pigs and wading birds. Most of these human infections are asymptomatic or result in only mild symptoms, however, a small percentage of infected people develop inflammation of the brain, with symptoms including headache, high fever, disorientation, coma, tremors and convulsions.

Transfusion-related JEV transmission has not been reported in the literature, although the potential for this type of transmission has been recognized. This type of transmission can happen because the search of the virus is not mandatory on blood donors.

Control of JEV is achieved through human and/or swine vaccination, changes in animal husbandry, mosquito control, or a combination of these strategies.

Potency testing of JE vaccine has been a complex process since its inception. To overcome difficulties encountered therein, an alternative assay, serum neutralization test, using Baby Hamster Kidney 21 cell line, has been standardized. The antibody response generated against JE vaccine was quantified and the assay was found to be sensitive and specific enough with significant accuracy and precision.

Vaccination programs, increased living standards, and mechanization of agriculture are key factors in the decline in the incidence of this disease. However, the recent increase of the world population especially on the Asian countries, means that there may be also an increase of the virus transition.

**Keywords:** Japanese Encephalitis; Mosquitoes; Infection; Asymptomatic or mild symptoms; Vaccination; Antibody

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## SCREENING: IN THE BLOOD - ZIKA VÍRUS

**Catarina Pires, Gonçalo Simões, Inês Melo, Rúben Nunes**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Ciências Biomédicas Laboratoriais, Coimbra, Portugal*

Zika vírus (ZIKV) it's a vírus transmitted by arthropods (arbovirus) of the genus Flavivirus and of the family Flaviviridae.

Isolated for the first time from a nonhuman primate in 1947, through a network monitoring yellow fever, and from mosquitoes in 1948 in Africa, being later isolated in humans in 1952.

The main transmission vector in humans it's through *Aedes Aegypti* mosquito, in tropical areas. Although the similarity with the Flavivirus relatives, the exclusive structural and functional mechanisms of ZIKV require an explanation about receptor specificity, transmission and antigenicity.

Progress in defining the immunodominant epitopes and how the neutralizing antibodies bind to them will provide great insight as the vaccines progress through clinical trials.

As a precaution, it has been recommended that people who have traveled to areas with high or moderate risk of transmitting the virus, should wait 28 days to donate blood.

It was declared a public health emergency, in 2016 by the World Health Organization, due to its association with congenital deformities, particularly microcephaly in infants of infected mothers.

**Keywords:** Zika, vírus, *Aedes*, arbovirus, Flavivirus, microcephaly, ZIKV

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## SCREENING IN THE BLOOD: TICK BORNE ENCEPHALITIS VIRUSES

**Alexandre Pimentel, Andreia Fernandes, Maria Francisca Madeira, Xia Haojie**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Ciências Biomédicas Laboratoriais, Coimbra, Portugal*

Tick Borne Encephalitis Virus (TBEV) has been described in 1931 and isolated in 1937. It has a distribution throughout various endemic regions such as Europe, Siberia, Far Eastern Russia, Northern China and Japan.

It belongs to the Flaviviridae family and Flavivirus genre and has 3 sub types: European, Far Eastern and Siberian. It has an enveloped polyhedral nucleocapsid symmetry, spherical particles and is 40-60nm in diameter. It is a single stranded RNA, stable at low temperatures (-60°C or below) and inactivated by the UV light.

TBEV induces Tick Borne Encephalitis (TBE), a viral infection involving the central nervous system. Its transmission is through hard tick bites (Ixodidae family), which act as the vector and reservoir on main hosts, such as small rodents, and accidentally on humans. It can also be a consequence of the consumption of unpasteurized milk from infected goats, sheep or cows. Person to person transmission has never been reported, with the exception of vertical transmission (from infected mother to fetus).

There are only two described cases where transmission through blood transfusion has occurred, in which the donor was infected and the receiver got infected as well. This situation is so rare that there is no need for screening on blood donations.

The diagnose tests are immunoglobulin (Ig) G, IgM, Enzyme-Linked Immunosorbent Assay (ELISA) and Real Time-Polymerase Chain Reaction (RT-PCR). There is no specific treatment for TBE.

**Keywords:** Ticks, Ixodidae, tickborne encephalitis, tickborne encephalitis virus, Flaviridae

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## HUMAN PARVOVIRUS B19

***Flávia Pinto, Helena Timóteo, Milene Gomes, Tiago Casola***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Ciências Biomédicas Laboratoriais, Coimbra, Portugal*

The Parvovirus B19 was discovered in 1974 by Crossart, being the only member of the Parvoviridae family considered pathogenic for humans.

The viral genome consists of a single strand of DNA, encoding 3 major proteins: the non-structural protein (NS1) and the viral capsid structural proteins (VP1 and VP2). The B19 Capsid has an isochrohedral structure and consists of 60 capsomeres, being a naked virus.

The clinical features of the infection by the parvovirus vary with the age and immunological state of the host. The clinical entities associated with this infection are erythema infectiosum in healthy children, the transient aplastic crisis in patients with an underlying haematological illness, hydrops fetalis in the foetus and chronic anaemia in the immunocompromised.

The population most affected are children between 5 and 15 years. About 70% of individuals who reach adulthood already have antibodies against parvovirus B19, which is why it is much less common in this age group.

The Parvovirus B19 can be detected in serum and synovial liquid. The most common techniques for identifying parvovirus B-19 are Enzyme-Linked Immunosorbent Assay (ELISA), for detection of antibodies immunoglobulin (Ig) M, IgA, IgG anti- B19, and isolation of viral DNA by direct hybridization and Polymerase Chain Reaction.

The virus can be transmitted by blood, saliva, nasopharyngeal secretions and maternal-fetal pathway. Treatment is non-specific and consists of the use of retroviral drugs.

**Keywords:** Parvovirus B19, Clinical manifestations, ELISA, Antibodies anti-B19, Viral DNA

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## **WEST NILE VIRUS**

***Carolina Melo, Flávia Miranda, Inês Dias, Mónica Amaral***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Ciências Biomédicas Laboratoriais, Coimbra, Portugal*

West Nile virus (WNV) belongs to the Flaviviridae family and Flavivirus genus and is commonly found in Africa, Western Europe, the Middle East, North America and West Asia.

WNV is maintained in nature in an enzootic cycle involving transmission between birds and mosquitoes. Birds act as reservoir hosts and mosquitoes are the vectors. When feeding on the birds, mosquitoes can then become infected, completing the cycle. Occasionally, humans and other large mammals can be infected mainly by mosquitoes bites (genus *Culex*). Although it is uncommon, it can be transmitted by organ transplant, blood transfusions and breast milk. There is one reported case of transplacental WNV transmission and, to date, no human-to-human transmission of WNV through casual contact has been documented. Humans are “dead-end” hosts, that is WNV does not efficiently replicate within their cells and they cannot spread infection to new vectors.

Most infection in humans are asymptomatic and less than 1% of infected cases develop a severe disease such as neuroinvasive disease or fulminant hepatitis.

In humans, the viraemia generally lasts no more than 28 days, with its peak at 4-8 days post-infection and is followed by the rapid appearance of immunoglobulin (Ig) M followed by IgG. There is no chronic stage.

All donated blood is tested for WNV by Nuclei Acid Test. Although, the relatively short period of infectivity followed by rapid appearance of humoral response enables alternative strategies to be considered.

There is no vaccine for humans and there are no specific antiviral drugs.

**Keywords:** Flaviviridae, transmission of WNV, infection in humans,, screening in donated blood, West Nile Virus

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): HEALTHY FOOD AVAILABILITY PROMOTION**

***Catarina Maurício, Eduarda Costa, Helena Teixeira, Raquel Luís, Vera Gonçalves***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

It is well recognized that a non-healthy diet is often related with chronic diseases development. Thus, a strategy, called Integrated Strategy for the promotion of healthy eating (EIPAS), was created by an intersectoral group of portuguese authorities. The EIPAS aims to encourage the adequate intake of nutrients and, consequently, improve the citizens' nutritional status, having a direct impact on chronic diseases. It is based on four axes.

The aim of axis number 1 is to facilitate individual choices, regulating prices, access and attractiveness and promoting healthy food availability and its adequate composition.

This axis suggests strategies such as: salt, sugar and trans-fat monitoring; improvement of water, vegetables and fruit availability on public events; and the accessibility of free water dispensators at the public services.

With these measures it is expected to improve the Portuguese population's quality of life and decrease the risk of chronic diseases development.

**Keywords:** healthy eating; healthy measures; salt content; sugar content; trans fat content

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): HEALTHIER CHOICES**

***Cátia Pereira, Mafalda Eulálio, Mara Coelho, Nádia Martins***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

Poor eating habits are the main determinant for the loss of the number for healthy years. Associated with this, some chronic pathologies are emerging, such as cardiovascular diseases, diabetes, arterial hypertension, dyslipidemia and obesity.

In order to improve the nutritional status of the Portuguese population, the National Program for the Promotion of Healthy Eating (PNPAS) was created aiming to encourage the availability and consumption of foods that constitute the pattern of healthy eating and stimulate the population to integrate them in their daily routines.

To achieve this goal, in 2017 was developed the Integrated Strategy for the Promotion of Healthy Food (EIPAS), which is structured in 4 main axes. The general objective of axis 1 is to facilitate healthy offers and choices regarding price, access and attractiveness, which will promote an increase in food availability.

This axis presents some strategies such as: promoting intake of fruit and vegetables; decreasing the size of prepackaged food portions as well as the volume of a sugar packet; stimulates the consumption of local and organic products; establishes good practices associated with the guidelines for school cafeterias of the DGE regarding the acquisition of school meal delivery services; and extends existing guidelines concerning the use of iodized salt. Also, it promotes the removal of salt shakers from tables in collective catering; and make available adapted menus for the most dominant pathologies.

It is expected those strategies will have an impact on the treatment of chronic diseases as well as improve the health status of the population.

These politics should be widely implemented in catering companies so the expected results of these intersectoral strategies may occur.

**Keywords:** strategy; healthy eating; chronic diseases; politics; food availability

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): COMBATING NUTRITIONAL DESINFORMATION**

***Beatriz Norte, Eduarda Carreira, Joana Cunha, Mónica Lopes***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

Nowadays, wrong food habits are the major risk for a decrease of healthy life expectancy and for the emergence of many chronic diseases, accounting for more than 85% of diseases in Portuguese health system. That fact might show the lack of nutritional politics in our country. Therefore, an intersectoral group of Portuguese authorities designed Integrated Strategy for the Promotion of Healthy Eating (EIPAS).

The aim of this policy is to encourage a healthy eating, namely a complete, varied and balanced diet providing adequate energy and physical well-being throughout the day, as well as improving nutritional status. This document is presented in four axes.

Axis number 2 refers to lack of correct information regulated by credible authorities. Thus, it intends to improve quality and accessibility of information, empowering citizens for healthy food choices, having purposes such as improvement food labeling, advertising adjustment, appeal to the use of digital media and involvement of local authorities and agricultural associations.

Food and nutritional policies like EIPAS have the potential to lead the population towards a healthy lifestyle, reducing chronic diseases and increasing life expectancy.

**Keywords:** healthy eating; labeling; nutritional policies; advertising; information

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): LITERACY IMPROVEMENT**

***Catarina Camacho, Denira Nunes, Diane Reis, João Lé***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

It is well established that the adoption of less healthy lifestyles entails negative consequences on the welfare of the population and has a major impact on health. Therefore, an intersectoral group of Portuguese Authorities has designed the Integrated Strategy for Promotion of Healthy Eating defined in a set of four strategic axes and aimed to promote health through the implementation of strategies leading to adoption of healthier eating habits and lifestyle.

Axis 3 is supported by fifteen measures. They advocate the promotion of community literacy by raising awareness of the health impact of a less balanced diet and the importance of creating healthy eating habits; the promotion of the consumption of the mediterranean diet; and the training of professionals, health related and others. The presented measures also foresee the support of local organs for education and activities.

This strategy is expected to improve food consumption, contributing to better nutritional status and increasing physical and psychological well-being and quality of life of the population. In this way, a positive impact both on prevention and the reduction of the incidence of chronic diseases in the community is anticipated.

**Keywords:** mediterranean diet; health promotion; governmental strategies; promotion of healthy eating; literacy

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): INNOVATION AND TECHNOLOGY**

***Ana Monteiro, Ana Tavares, Andreia Vieira, Francisca Magalhães, Maria Damas***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

The EIPAS (Integrated Strategy for the Promotion of Healthy Eating) is integrated into the Portuguese National Health Plan. It's general aim is to promote adequate food consumption and the consequent improvement of citizens' nutritional status, which has a direct impact on the prevention and control of chronic diseases.

The present analysis intends to present axis 4 of EIPAS, developed to gather initiatives that use innovation and technological development to change attitudes and behaviours related to healthy eating, taking advantage of the Portuguese business network and their advertising spaces.

Therefore, some strategies were suggested: the use of digital technology as a vector for promotion of healthy eating habits, namely the conception of websites containing general nutritional information or food-specific; appropriate research funding; and the design of sustainable and innovative diet monitoring platforms.

The implementation of these measures in Portugal is of major public interest, since they might show beneficial impact in promoting healthier habits and contribute to the prevention and treatment of non-transmittable chronic diseases.

**Keywords:** digital platforms; political funding; food promotion; digital media; healthy food

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): FOOD AVAILABILITY ADEQUATION**

***Beatriz Santos, Carlota Gonçalves, Karin Varela, Sara Beato, Sofia Miranda***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

The Integrated Strategy for the Promotion of Healthy Eating (EIPAS), created by DGS and published on December 29th 2017, reports a set of measures, agreed by an intersectoral working group. The framework of this Strategy was based on WHO's declaration of "Health in All Policies", European Commission and sustained by the most recent data produced by the National Food Inquiry. The analysis of these data enable to identify the main nutritional problems of the Portuguese population and to propose some measures to change this condition. The aim of this poster is to present to school population the first axis of this strategy, in order to improve their nutritional literacy. The objective of the axis 1 is to promote the improvement of the availability and composition of foods, particularly in reducing salt, sugar, and trans fatty acids contents. Also, it promotes the existence of free water dispensers in services and organisms of the direct and indirect administration of the state; extends existing guidelines for the provision of food in schools under responsibility of the Ministry of Education, at all levels of education and teaching including higher education; and establishes guidelines for the food supply in social institutions, in particular those that support the elderly population. With the implementation of these measures it is expected that the population might be able to improve behaviours and contribute to their nutritional and health status.

**Keywords:** nutritional policy; national strategy; citizens; food availability; food habits

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): CHANGING AVAILABILITIES**

***Ana Beatriz Rodrigues, Inês Santos, Marisa Rodrigues, Teresa Ferreira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

Inadequate food habits are an important determinant for the incidence of chronic diseases. This lead to the design of an “Integrated Strategy for the Promotion of Healthy Eating” (EIPAS), encouraging adequate food consumption and improving the nutritional status of population, preventing and controlling chronic diseases. This was based on a intersectoral agreement approach, with the objective to modify the food supply of certain foods and encourage the nutritional reformulation of food products.

Axis 1 presents some strategic measures, namely: opting for short chains, with integrated or biological production modes; use iodized salt in canteens; encourage collective catering companies to remove the salt shakers from the tables, as well as to avoid the easy provision of sugary drinks. Also, it intends to encourage intake of fruit, milk and vegetables in schools, reduce the size of pre-packaged food portions and beverages as well as sugar packets. The availability of adapted menus to the most prevalent pathologies is also suggested.

Therefore, the main goal of this axis is to modify the food purchasing environment, by changing its availability and reformulating certain food categories, ensuring that healthy choices are the easiest in terms of price and access, improving food composition, namely in terms of salt, sugar, and trans fatty acids.

**Keywords:** food; healthy; strategy; availabilities

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): AVAILABILITY OF QUALIFIED NUTRITIONAL INFORMATION**

***Andreia Nascimento, Bárbara Alexandre, Maria João Rosa, Mariana Pinto, Rita Fernandes***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

It is recognised that portuguese lifestyle is unhealthy, leading to a significant impact on levels of wellbeing and productivity, and this is one of the concerns of Public Health. Thus, the Integrated Strategy for the Promotion of Healthy Food establishes the promotion of health as a priority, strengthening the importance of a healthy diet. The main objective is to improve the quality and accessibility of information available in order to empower citizens for healthy food choices contributing to a better food and nutritional pattern in Portugal.

The strategy is divided into four axes; the axis two consists of several proposals for intervention, such as: encouraging the use of nutritional information models on food labels to inform trans fat acids content; develop measures by economic operators to limit the advertising of foodstuffs with excessive salt, fat and sugar intended for youth and avoid them in sporting and cultural events; promote the involvement of local authorities and new digital media to enable quality messages about healthy eating; and develop initiatives in partnership with associations of the food industry, providing healthier food and creating a platform for dissemination and monitoring thereof.

The implementation of these measures should promote a healthier diet for the portuguese population by increasing the autonomy of each consumer to make better food choices, contributing to the reduction of the prevalence of chronic and metabolic diseases.

**Keywords:** healthy food; strategy; food products; nutritional information; citizens

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): IMPROVEMENT OF NUTRITIONAL LITERACY**

***Filipa Costa, Marta Martins, Sandra Fernandes, Tânia Lopes, Tatiana Almeida***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

The Integrated Strategy for the Promotion of Healthy Eating (EIPAS) was developed to intervene in food area in order to promote a healthy diet by promoting a reduction of consumption of sugar, salt and fats, and increasing the availability of healthy foods, nutritional status of citizens and consequently the reduction of noncommunicable chronic diseases (NCDs). This strategy involves an intersectoral action, leaded by the DGS. It was based on a survey of external suggestions, documents from the European Commission, World Health Organization (WHO), Food and Agriculture Organization, data from the National Food Survey and Physical Activity and, finally, orders and professional associations.

This strategy should have a major impact for Portugal since NCDs represents 85% of all diseases. This strategy is presented into axes. The aim of axis 3 is to promote and develop the literacy and autonomy for the exercise of healthy choices by the consumer, which will be analyzed. The high NCDs rate has a greater impact on populations with lower educational levels and lower incomes. Therefore, this axis aims to guide individuals from all levels of literacy for healthy food choices and increase knowledge in other non-health professionals so that everyone can promote a healthy diet.

EIPAS is a health integration promoter into all policies. This must be promoted by the direct and indirect services of the state in its operational areas and monitored by an intersectoral group.

**Keywords:** health promotion; nutrition; literacy; mediterranean diet; politics

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## **INTEGRATED STRATEGY FOR THE PROMOTION OF HEALTHY EATING (EIPAS): INNOVATION AND ENTREPRENEURSHIP**

***Ana Carolina Morgado, Ana Jorge, Lara Faria, Marisa Pereira, Marta Figueira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Dietética e Nutrição, Coimbra, Portugal*

The unhealthy eating habits of the Portuguese population are the main risk factor for the disability-adjusted life year and have a big impact in the development of chronic diseases. Therefore, the World Health Organization and the European Commission recommended that the national strategies regarding food and nutrition should be based in interventional models.

Thus, it was developed the “Integrated Strategy for the Promotion of Healthy Eating” which is part of a strategic axe of the “National Health Plan” from “Direção Geral da Saúde”. The goal of this strategy is to encourage healthier eating habits as a way to improve the nutritional status of the population and consequently the prevention of chronic diseases. The analysed data for the elaboration of the strategy allowed the identification of the main nutritional problem originating four different interventional axes.

The aim of the fourth axe is to identify different initiatives regarding innovation and technology as a mean to change knowledge, behaviours and attitudes face to healthy food. Five measures were considered in this axe. Provide interactive materials in the education system to promote fish consumption; promote healthy food through digital media in public institutions; improve funding for research aimed to promoting healthy food; create innovative and sustainable food monitoring systems; and develop a free and universal digital platform regarding nutritional information of food.

Thus, all this measures intend to promote the innovation and the entrepreneurship directed to the promotion of healthy food, as a way to improve the nutritional state of the Portuguese population.

**Keywords:** innovation; entrepreneurship; technology; healthy food

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## **AMBULATORY BLOOD PRESSURE MONITORING IN NIGHT WORKERS**

***Andreia Margarido, Joaquim Pereira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisiologia Clínica, Coimbra, Portugal*

With the industrial revolution, there was a growing evolution and technological globalization, thus requiring numerous adaptations in the world of work, aiming mainly at increasing productivity.

Workers who work in shifts or have night work usually have poor sleep during the day and inevitably have consequences, such as increasing drowsiness during work hours, often leading to disinterest, anxiety, irritability, stress and even the occurrence of various types of accidents.

The circadian cycle is regulated by the suprachiasmatic nucleus that responds to light signals as a function of what is transmitted through the optic nerve. When light emerges, the retina transmits information via the glutamate pathway to the suprachiasmatic nucleus thus leading the information to the pituitary by inhibiting the secretion of melatonin. This cycle regulates hormones, appetite, body temperatures, heart rate, blood pressure, sleep, among other mechanisms.

When the work is performed at night, there are changes in the circadian cycle manifesting in the decrease in heart rate and blood pressure at moments close to bedtime, in the same way as the increase of these same parameters when approaching time to wake up. The relationship between blood pressure and shift work, more specifically in the bakery sector in continuous analysis.

**Keywords:** Blood pressure; Night worker; ABPM

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## HEART RATE VARIABILITY IN TOP-LEVEL SWIMMERS

***Eduarda Pereira, Joaquim Pereira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisiologia Clínica, Coimbra, Portugal*

Currently, the performance of professional swimmers is correlated with the activity of the autonomic nervous system (ANS) indexed by heart rate variation.

Heart rate variability reflects changes in heart rate intervals. It is considered fundamental as a controlling factor of the physical condition or of the fatigue of swimmers and as a defining parameter of the eventual adaptation of individuals to the training load. This allows coaches to support future decisions regarding physical training prescriptions.

The objective of the present study is to evaluate heart rate variability in top-level swimmers (HRV) and to maximize athletic performance and competitive outcome.

This study will be divided into three evaluation moments. Twenty-four federated swimmers were divided in two groups: athletes who have been swimming for more than five years (eleven athletes: seven male and four female); and athletes who have been swimming for five or less years (thirteen athletes: five male and eight female).

Based on the results obtained during the different moments, the best strategy will be adopted in order to maximize the performance, and consequently the competitive results of the athlete.

**Keywords:** Heart Rate Variability, sports training, training load, swimming, autonomic nervous system.

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## HEART RATE VARIABILITY AND ARRHYTHMIAS

***Cátia Flório, Joaquim Pereira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisiologia Clínica, Coimbra, Portugal*

Atrial fibrillation (AF) affects about 1,5-2% of population, being the main cardiac sustained arrhythmia and affects principally people between 75 and 85 years old. One of the main characteristics of AF, beside the high ventricular rates, is the R-R variability. However, there are studies that have been demonstrating that some patients with this arrhythmia, presents a decreased irregularity in the ventricular response, contrary to what was expected, associated with that an increase in the mortality. It is thought that in the origin of this phenomenon may be alterations in the Autonomic Nervous System (that it is known to play a very important role in the initiation and maintenance of this concrete arrhythmia) which are reflected in the Heart Rate Variability (HRV).

The purpose of this study is to find out if in a sample of patients with AF there is a decrease in the HRV of some of them, followed by an analysis to some parameters known as sudden death markers, in order to verify if there is any type of relation between the AF and the changes that it origins in the heart and the larger incidence of Sudden Death verified in these patients.

**Keywords:** Atrial Fibrillation; Autonomic Nervous System; Heart Rate Variability; Ventricular arrhythmias

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## HIGH RESOLUTION ELECTROCARDIOGRAM AND QT VARIABILITY IN THE DIAGNOSIS OF ARRHYTHMIC RISK

**Joana Silva, Joaquim Pereira**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisiologia Clínica, Coimbra, Portugal*

Since the number of overweight individuals has been increasing, with the female population being the most affected, and knowing that overweight is related to an increased risk of arrhythmias and sudden cardiac death, and these with late potentials and a greater dispersion of the QT interval, the study aims to verify whether the arrhythmic risk in overweight individuals, especially in young women, can be predicted through parameters known as predictive of arrhythmic risk such as late potentials, QT interval variability and variability of heart rate.

Of all risk factors, such as age, hypertension, diabetes mellitus and smoking habits, BMI is the only one that has a significant association with electrocardiographic values, hence it is the parameter used to select the sample.

There are several studies showing that overweight women have a longer duration and dispersion of the P wave, a longer QT interval, greater QT interval variability and abnormal late potentials compared to non-overweight women, indicating that they have a higher risk of atrial and ventricular arrhythmias and sudden cardiac death.

The fact that these changes / abnormalities are reversed with weight loss and consequently a reduction in BMI allows us to have a positive view on the subject, since our sample is of young individuals, who if they present arrhythmic risk, can reverse the situation with success and improve not only its quality but also life expectancy.

**Keywords:** ECGHR, QT variability, overweight, arrhythmic risk

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## TENSIONAL PROFILE AND OBESITY

**Ana Filipa Silva, Joaquim Pereira**

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisiologia Clínica, Coimbra, Portugal*

In Portugal, there are more than two million hypertensive patients, where only 50% know that they suffer from this pathology, that is, about 1 million hypertensive patients do not have controlled or corrected BP, which causes AHT to be a major risk of cardiovascular disease.

It is also known that the numbers of young people with AHT have increased significantly, such as the number of obese, with a prominent relationship between the tension profile and obesity.

According to the World Health Organization study, Portugal is in the top 5 of the countries with more obese adolescents. According to data from 2014, about 5% of adolescents in Portugal are overweight, which is 0.3 percentage points more than in 2002. Also a study by João Fernandes, a researcher from the Catholic University of Porto, showed that in 25 years, 1980 up to 2015, the rate of obesity in Portuguese young people under 20 years old has almost tripled (from 3% to 8%), with the highest number of adults being registered in women (22% women vs 17% men), as in all the world. The study also revealed that by 2015, approximately 4 million people died from overweight diseases, including cardiovascular disease.

Thus, the work has a relevant character for today, because it is two prominent pathologies in society not only Portuguese, but worldwide, which appear earlier and it is therefore necessary to change / open mentalities . It is not by chance that the non-pharmacological measures to combat hypertension are the same as measures to combat obesity: to make a healthy diet rich in vegetables, vegetables and fruits and low in salt and sugar and to practice physical exercise.

In conclusion, our work consists, through questionnaires, to select 20 young women to perform ABPM and draw conclusions / strengthen the certainties between the relationship between obesity and hypertension.

**Keywords:** Obesity; Arterial Hypertension; ABPM.

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## **EVALUATION OF THE PRECISION OF THE AUTOMATIC REPORT OF THE ELECTROCARDIOGRAM**

***Beatriz Couto, Joaquim Pereira***

*Instituto Politécnico de Coimbra, ESTeSC-Coimbra Health School, Fisiologia Clínica, Coimbra, Portugal*

Automatic reports classify the tests as normal or abnormal based on an algorithm designed to recognize and measure the components of the waves that make up the electrocardiogram signal. Since the early algorithms have evolved and are increasingly used, it is necessary to assess their accuracy and realize the extent to which it will be advantageous to use these reports. The ECG is a noninvasive test that provides us with information about the electrical conduction of the heart. The electrocardiograph uses electrodes placed at specific sites on the trunk and limbs to detect depolarization and repolarization of myocardial cells. Most equipment uses 12 leads to record the potential difference between these same electrodes and to form the ECG waves. The ECG interpretation is based on the analysis of the waves representing atrial depolarization (P wave), ventricular depolarization (QRS complex) and ventricular repolarization (T wave), which allow us to infer about the state of the heart. The amplitude, direction and duration of these waves, as well as the segments and intervals between them, are the parameters on which we rely to report the examination. The automated report was designed to increase the productivity of the professionals, reducing the time taken to perform and analyze the ECG, the human error and the variations between interpretations of the same exam between professionals. The programming that allows us to obtain the automatic report is available in most of the equipment currently and is developed in order to make measurements and to provide diagnoses as close as possible to those obtained by professionals. This program in addition to making measurements also acquires signal, performs the conditioning of the same (transmission and storage of information) and characterizes the waves detected.

**Keywords:** Electrocardiogram; Interpretation; Algorithm.

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## **ACTION OF L- DOPA THERAPY ON PARKINSON'S DISEASE**

**Ana Isabel Castro, Cátia Oliveira, Diana Pereira, Irina Canossa, Sónia Francisco, Tatiana Costa**

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School Farmácia, Portugal*

Parkinson's disease was firstly described on 1817 by James Parkinson in his innovative article "An essay on the shaking palsy". Parkinson's disease, a common neurovegetative disorder with a variety of motor and non-motor symptoms is the second most prevalent neurovegetative disease Worldwide. Parkinsonism is diagnosed when there is bradykinesia among other features such as muscular rigidity, resting tremor or postural instability. The principal pathological characteristic of Parkinsonism is the progressive death of pigmented neurons of the substantia nigra pars compacta (SNc). Initially It is observed a loss of dopamine-producing cells in the substantia nigra in the midbrain, followed by degeneration of nigrostriatal pathway, depriving basal ganglia of dopamine for motor activities. More recently, there is a theory suggesting that the pathology starts in the gut, then utilizing the vagus nerve, it ascends to the olfactory bulb and vagal motor nucleus at the caudal medulla oblongata progressing up the brainstem and diencephalon to the cortex. The initial pharmacological therapies for Parkinson's disease was the use of dopamine precursor L-3,4-dihydroxyphenylalanine (L-DOPA ou levodopa) to enhance synaptic dopamine transmission. Five decades passed since L-DOPA introduction on therapy but It is still the most effective drug.

In this work, we will present a general scheme of the mechanism of action of levodopa (L-DOPA) on anatomic structures and physiological fundamentals involved.

**Keywords:** Parkinson's disease; L- DOPA; dopamine

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## MODULATORS OF PSYCHOLOGICAL DISORDERS

***Carla Coelho, Carolina Araújo, Ana Margarida, Andreia Santos, Filipe Estêvão***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School Farmácia, Portugal*

Neurons are nervous cells that communicate through synapses, which their main function is to guide the information through electrical signals that are converted in chemical agents called neurotransmitters. Modulators are chemical substances that can stimulate or inhibit the receptors of neurotransmitters. In other words, neurotransmitters are an example of modulators.

When an anomaly occurs in these chemical substances it can develop psychological disorders, such as depression, bipolarity and schizophrenia. Currently, the most effective way to treat these disorders is through pharmacotherapy. The pharmacotherapy occurs through the interaction of the receptors with neurotransmitters, the objective of this therapy is to treat psychological disorders that unbalance the neurotransmitter's message. Examples of neurotransmitters are acetylcholine, dopamine, GABA or serotonin.

The most applied drugs to fight these disorders are antidepressants, anxiolytics, mood stabilizers and antipsychotics. Antidepressants replace neurotransmitters like noradrenaline and serotonin to stabilize neuronal synapses. Anxiolytics block the action of dopamine and serotonin neurotransmitter, this way these drugs balance the chemical disproportion created by the disorder. Mood stabilizers are a psychiatric pharmaceutical drug used to treat mood disorders characterized by intense and sustained mood shifts, typically bipolar disorder. GABA is the principal inhibitor of neurotransmitters, it's located in the cerebellum and retinal presynaptic inhibitory neurons. Valproic acid, a mood stabilizer, performs to increase the levels of GABA, increasing its liberation. The decrease of GABA's levels causes an alteration of humor in the CNS and limbic system, which causes periods of highs and lows, mania and depression respectively.

**Keywords:** Modulators; Neurotransmitters; Neurons; Synapses; Pharmacotherapy.

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## PHYSIOLOGY OF DRUG ACTION ON CENTRAL NERVOUS SYSTEM

***Francisco Teixeira, Iara Coelho, Inês Silva, Ricardo Madeira***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School Farmácia, Portugal*

The CNS is composed by the brain and the spinal cord, as a result, it is more complex and less understood than the other organs and, in many cases, the mechanism of action of neuropharmacological drugs is unclear. However, they all have in common the ability to alter brain function.

Drug is any substance, natural or synthetic, that modifies its functions once it's introduced into the body. There are functional interactions between neurons without synaptic contacts, and matches between release sites and localization of receptors sensitive to the chemical signal are exceptions rather than the rule in the central nervous system.

Drugs that act on the central nervous system are called "psychotropic". This word is formed by the junction of other two: psycho and tropic. Psycho represents what we feel, do and think and tropic means attraction for something. So psychotropic drugs act on our brain altering the way people think, feel and behave by disrupting neurotransmission which is the process of communication between brain cells. The psychotropic drugs can be divided in three groups: depressives, stimulants and the disturbing ones. In this work we will approach the effects of them.

**Keywords:** Central nervous system, action, drug, psychotropic, neurons

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## ALZHEIMER'S DISEASE – CHOLINESTERASE INHIBITORS

***Beatriz Marques, Gabriel Rodrigues, João Marques, Ricardo Gonçalves, Rita Galinha***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School Farmácia, Portugal*

Alzheimer's disease is a neurodegenerative disease known to cause reduction in the size and number of cells by, damaging, in an irreversible way, some cognitive functions, such as memory and thought.

The aim of this review was to present the Alzheimer's disease – cholinesterase inhibitors. The methodology focuses on scientific articles and other sources on this subject, for example master thesis, in Google Scholar.

One of the symptoms of this disease is the emergence of neurofibrillar braids, which consists of an anomaly of the fibrillary proteins and the senis plaques, which result from the junction of fragments of the incorrect cleavage of the amyloid precursor protein. Usually, this disease is diagnosed to people over 60 years of age.

As the disease has evolved, the connections between the neurons become progressively weaker and eventually will disappear. This is because the carriers of the disease have a low level of acetylcholine, which is a neurotransmitter found in the muscular joints and in the brain, which is hydrolysed by the enzyme acetylcholinesterase eventually destroying it. Thus, it is necessary to maintain the levels of acetylcholine, so that the neurotransmitter is not eliminated, thus increasing the ability to stimulate the following neurons. Acetylcholinesterase inhibitors are used to increase the concentration of acetylcholine and consequently the communication between the nerve cells, which causes a relief, albeit temporary, of the symptoms of the disease.

Since there is no cure for Alzheimer's disease the treatment focuses on the control of the disease and in protecting the patients for the effects that are caused by the deterioration of the brain cells.

**Keywords:** Alzheimer, Cholinesterase inhibitors, Disease

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## THE PINEAL GLAND

***Mafalda Machado, Maria Maia, Gabriela Teixeira, Timóteo Afonso, Aya Kassah***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School Farmácia, Portugal*

The Pineal Gland is a small cone-shaped endocrine gland located near the center of the brain of vertebrates, more specifically the epithalamus, between the two hemispheres, where the two halves of the thalamus unite.

This has as main function to regulate sleep, by producing a designated hormone melatonin. It is through this substance that we can regulate our circadian rhythms, which controls the vital cycles of the human body, such as sleep patterns and the biological clock.

Circadian rhythms are important cyclical temporal orientation functions of living beings with regard to behavioural strategies to be adopted during the year. The main rate used for synchronization with the environment is the rhythm chiaroscuro or also called photo period. The pineal gland does stimulus transduction of light, turning light information on hormone secretion of melatonin. This will act on target organs, such as the suprachiasmatic nucleus of the hypothalamus and the pituitary gland, which emit neural or hormonal signals that synchronize the behaviour, including reproductive.

It is concluded that the pineal gland is the primary marker of circadian rhythm, where the light has a strong influence on the behaviour of adaptation to environmental changes.

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## **DEGENERATIVE RETINAL DISEASES: VEGF INHIBITORS**

**Ana Rita Amaro, Ana Rita Ferreira, Catarina Seixas, Francisco Salgado, Teresa Margarida Alves**

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School Farmácia, Portugal*

Muscular degeneration and retinitis pigmentosa are two degenerative diseases of the retina, the objective of our informational poster will fall on the importance of knowing these diseases and their treatments in detail.

Muscle degeneration is age-related (AMD) and is a disease that occurs in a part of the retina called the macula (a small region in the center of the retina that allows a person to see details) and leads to progressive loss of central vision. Light-sensitive cells, known as photoreceptors, convert light from the visual field into electrical impulses and then transfer the impulses to the brain through the optic nerve. The loss of central vision in AMD occurs when the photoreceptor cells in the macula are degenerate.

And pigmentary retinitis is a hereditary disease that affects the photoreceptors (light sensitive cells). The most common symptoms are difficulty seeing at night and decreased peripheral vision. The symptoms gradually manifest themselves. As peripheral vision worsens, people can start tunneling. However, total blindness is uncommon.

The most recent treatments are the VEGF (neovascularization inhibitor) inhibitor compounds that are substances released by disease-retinal cells that are responsible for stimulating the proliferation of new blood vessels - which is undesirable in the retina.

**Keywords:** Retina; Age-related macular degeneration; VEGF inhibitors; View; Treatments.

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## **VITAMIN C: IMPLICATIONS FOR THE PRODUCTION OF COLLAGEN**

***Beatriz Ferreira, Carolina Silva, Elsa Silvestre, Érica Peres, Melanie Cantante***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School Farmácia, Portugal*

Collagen is a protein that is produced naturally by the organism and it is very important for the formation and maintenance of the human body. Its action begins on the skin, helping to structure it by giving firmness and elasticity, reaching other tissues and guaranteeing the integrity of tendons, muscles, ligaments and joints.

But for the production of collagen to occur without problems, there is a substance that can not be lacking. Ascorbic acid or simply vitamin C is essential for collagen biosynthesis. It is of fundamental importance for the formation of collagen fibers, which are present in all tissues of the body.

Without an adequate amount of vitamin C, the production of collagen is impaired, such as for example the firmness and union of the cells of bones and muscles. In addition, this nutrient helps the body to protect itself against various health problems. The action of vitamin C ranges from combating colds, flu and other viruses to the prevention of cancer and other degenerative diseases.

**Keywords:** Vitamin C, collagen, protein

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## **ENDOTHELIAL DYSFUNCTION, ATHEROSCLEROSIS AND ARTERIAL HYPERTENSION – BETA BLOCKERS**

***Carlota Pina, Margarida Martins, Moushir Affaki, Rafael Tavares***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School Farmácia, Portugal*

The hypertension is a long-term medical condition in which the pressure in the blood flow is persistently elevated. Blood pressure is expressed by two measurements (the systolic pressure, which is the maximum pressure, and the diastolic pressure, which is the minimum). Normal blood pressure, when in resting, is within the range of 100-140 millimetres mercury (mmHg) concerning the systolic and 60-90 mmHg for the diastolic. Everything that is persistently above this “normal” values is considered high blood pressure.

High blood pressure usually does not cause symptoms however, in long it's a major risk factor for coronary artery disease, stroke, peripheral vascular disease, vision loss, and chronic kidney disease.

To stop this, there's two types of treatment. The non-pharmacological one is based on a better lifestyle options such as the practise of exercise and a special diet. On the other hand, the pharmacological one is based in the use of antihypertensives, such as beta-blockers. Beta blockers are competitive antagonists that block the receptor sites for the adrenaline and noradrenaline, of the sympathetic nervous system. Some block the activation of all types of  $\beta$ -adrenergic receptors while others are selective for one of the three known types of beta receptors, designated  $\beta_1$ ,  $\beta_2$  and  $\beta_3$  receptors. This action causes the reduction of the heart rate and consequently the pressure itself it's relieved.

**Keywords:** Blood pressure, Hypertension, Beta-Blockers

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**IF CURRENTS-INIBITORS**

***Ana Daniela, Camila Bastos, Joana Coelho, João Tavares, Telma Medroa***

*Instituto Politécnico de Coimbra, ESTESC - Coimbra Health School Farmácia, Portugal*

In this work we discuss, as the main theme, the "If Current – Inhibitors", and we focused specifically on an inhibitor drug ivabradine, a medicine that serves for cardiovascular problems. Ivabradine is the most used medicine mainly in the disease "Angina", a disease caused by obstruction or spasms of the coronary arteries. Heart rate, a major determinant of angina in coronary disease, is also an important predictor of cardiovascular mortality. Ivabradine is the first selective sinus node If channel inhibitor in the treatment of stable angina approved by the FDA (Food and Drug Administration) in April 2015. Ivabradine acts on the If ion current, which is highly expressed in the sinoatrial node. If is a mixed  $\text{Na}^+/\text{K}^+$  inward current activated by hyperpolarization and modulated by the autonomic nervous system. It is one of the most important ionic currents for regulating pacemaker activity in the sinoatrial node. Ivabradine selectively inhibits the pacemaker If current in a dose-dependent manner. Blocking this channel reduces cardiac pacemaker activity, selectively slowing the heart rate and allowing more time for blood to flow to the myocardium, which does not change any major electrophysiological parameters unrelated to heart rate. This is in contrast to other commonly used rate-reducing medications, such as beta-blockers and calcium channel blockers, which not only reduce heart rate, but also the cardiac contractility. Given the selective decrease in rate without loss of contractility, ivabradine may prove efficacious for treatment of patients with stable angina.

**Keywords:** IF Current, Ivabradina, inibidores e Angina

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